Urban services environmental rating system

Progress report for 2000-2001

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Comparison of actual performance against work plan for financial year 2000 -2001

S. No.	Activity	Start Month	Finish Month	Actual Performance
1.	Literature survey	October' 99	June'00	Completed as per schedule. (See annexure A)
2.	Purchase of equipment	December'99	February'00	Due to non-availability of funds the procurement process was delayed. The placements of orders were completed by November, 2000.
3.	Kick off meeting with ULB's	January'00	January'00	Accomplished as per schedule. Discussed in previous NSC meeting
4.	Establishing link with two test municipal bodies	April'00	June'00	Completed as per schedule
5.	Newsletter	January'00	March'00	• Activity was delayed. It started in March, 2000 • Web site was established in April, 2000 • Brochure was published in June, 2000
6.	Organisational data and information collection	April'00	September'00	Completed as per schedule
7.	Environment surveys and monitoring test phase	April'00	December'00	Completed as per schedule

S. No.	Activity	Start Month	Finish Month	Actual Performance
8.	Development of analytical framework and feedback	January'00	September'00	Accomplished as per schedule (see section 3). Feedback taken during kick-off meeting and reported in previous NSC meeting .
9.	Development of indicator	April'00	September'00	Delayed. The activity was completed in November, 2000. (See section 4)
10.	Development of rating framework	April'00	December'00	Completed as per schedule.
11.	Interaction with first test ULB	April'00	December'00	The activity started in June, 2000. The activity was delayed due to slow response from Delhi Jal Board.
12.	Feed back from technical committee	October'00	December'00	The technical committee has not been formed. Technical committee shall be formed by July, 2001. However feed back was obtained from experts individually and from the beneficiaries in the workshops conducted under the project. (See section 5 and workshop details in annexure B)
13.	Status of sub contracts			Consultants have been appointed/ are being appointed (see section 2)

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Status of sub-contracts

Title of sub-contract	Sub-contractor	Duration of contract	Amount (Rs)	Status
Development of Management Information System	Dr P Pangotra, P&M Associates, Ahmedabad	8 months	18 lakhs	On-going
Development of Performance Indicators – Engineering aspects, Kanpur	Mr T D Daryana, Kanpur	6 months	10 lakhs	On-going
Development of Performance Indicators – Engineering aspects, Delhi	Negotiations on-going	6 months	12 lakhs	To commence
Training programme on Performance measurement	International expert – Dr D Ammons, USA	3 days	3.5 lakhs	Programme on 25-27 June 2001
Development of financial indicators	ICRA Advisory services, Delhi	3 months	2 lakhs	Negotiations on-going
Role of community participation in performance assessment	To identify consultants	3 months	2 lakhs	

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Framework for performance measurement

The USERS project has adopted the Input-Output-Efficiency-Outcome indicators model for developing a performance measurement system. We describe below briefly the framework. More details are available in the annex pertaining to literature survey.

What is performance measurement?

Performance measurement in the context of urban local bodies can be defined as determination of how effectively and efficiently a jurisdiction is delivering the public service of interest. (Fischer 1994). This would mean getting quantitative answers to questions on Where do we stand in relation to others delivering a particular program or service? Who is doing something out here better than we are? What are they doing that we are not, and how can we change to mirror their performance? A performance measure is virtually value-less if it appears in the form of an isolated, abstract number. Its value comes in comparison with a relevant peg i.e. a benchmark.

What is benchmarking?

It is important here to note the difference between *performance measurement and benchmarking*, terms which people often use interchangeably. The initial work done to specify and gather data on the criteria that account for the performance of a program or service is known as "performance measurement." Knowing the factors that are important in effectively performing a particular service or function is the foundation of benchmarking practice. Benchmarking per se is the next step, which is taken to discover what those identified as having best practices are doing that you are not doing. (Fischer 1994)

Performance measurement lets you quantify whatever variables are selected as underlying the performance of a particular service. On the other hand, benchmarking per se is a general means of comparison, the starting point for finding where changes are needed or not needed. Simply put, performance measurement is a planning tool, while benchmarking is an improvement tool. The practice is not an end in itself, nor is it an exact science. At best, both performance measurement and benchmarking are rough guides with which to begin the improvement process. (Fischer 1994).

A further distinction can be drawn between *benchmarks and benchmarking*. Comparing local performance statistics with selected benchmarks is not the same as full-fledged corporate style benchmarking. Benchmarking entails the analysis of performance gaps between one's own organisation and best-in-class performers, the identification of process differences that account for the gap, and the adaptation of key processes for implementation in one's own organisation in an effort to close the gap. A simple comparison of performance with selected municipal benchmarks is more limited but also less expensive and more practical for a general assessment of a broad range of functions. Such a comparison places local performance in context and, where major performance gaps are detected, may suggest that need for additional analysis, perhaps leading to a full-scale benchmarking project.

Performance measurement is a planning tool. The next step is benchmarking, which is an improvement (i.e., management) tool.

Key questions and issues

- Are we rating the city?
- Or, are we rating the service provider?
- These are linked issues, but the focus needs to be clear
- Emphasis on cause-effect relations
- Emphasis on quantification of processes and benchmarking

The entire exercise for performance measurement could be divided into two phases.

Phase I: City performance based on urban indicators

A number of local bodies constitute the large urban agglomerations like Delhi and Kanpur. Therefore before measuring performance of service delivery within the domain of specific urban local bodies it would be essential to measure and gauge the state of affairs for the entire city. This would not only help in getting the status of city at a glance, but also identify key problem areas of the city and assess at a later stage the contribution of the specific urban local body to it.

Urban indicators

The city level urban indicators would cover the following issues:

- Demographic
- Economic base
- Income distribution
- Cost of living index

Infrastructure and civic services

- Availability and coverage of water supply network
- Coverage of sewerage and drainage network and capacity of treatment plant
- Solid waste management
- Status of slums in city
- Accessibility of services to urban poor
- Accessibility to and availability of health facilities
- Development projects going on

General status of environment

- Health statistics
- Incidence of diseases
- Water pollution

Criteria for selection of indicators

These indicators are selected on the basis of data reliability, issue relevance and the user utility. Therefore after selection of the issues, these indicators are constructed and customised for further analysis. The criterion for selection of indicators is given in table 1.

Table 1: Criteria for indicator selection

Criteria	Properties
Policy relevance and utility for users	An environment indicator should: • Provide a representative picture • Simple, easy to interpret and able to show trends over time • Responsive to changes in the environment and related human activities • Provide a basis for international comparison • The scope of indicators be well defined i.e. national or regional environment issues • It must have a reference or threshold value against which to compare it so that users are able to assess the significance of values associated with it
Analytical soundness	An environment indicator should: • Theoretically well founded in technical and scientific terms

	• It should be based on international consensus about its validity • Lend itself to be linked to economic models, forecasting and information systems
Measurability	The data required to support the indicator should • Readily available • Adequately documented and of known quality • Updated at regular intervals in accordance with reliable procedures.

Source: UNEP (1995)

Benchmarking

The urban indicators could be then compared against following variables

- Against time
- Against targets/ standards
- With other cities

The performance of city can be evaluated with three approaches as discussed below.

1. Which indicator for each service has improved/degraded over the years?
2. Compare the urban indicators with other standards/ benchmarks
3. Comparison of urban indicators with other national/ international cities would highlight the red indicators for Kanpur and Delhi City for further improvement in comparison with other cities. It would also help in fixing up short-term targets for the two cities under consideration.

Phase II: Urban local body performance measurement

In phase II the performance of MCD, Delhi Jal board, Kanpur Nagar Nigam and Kanpu Jal Sansthan would be measured based on municipal level performance indicators. The broad framework for performance measurement would follow the input- output-efficiency and outcome frameworks.

The working methodology for this is given below.

Step 1 : Collection of Input data

What is Input data?

Input can be defined as resources that are available with the local body in delivering th service or resources that a local body spends while performing its duties. They are reall

not indicators in their true sense, but are essential for constructing indicators for performance measurement.
Some of the examples of input data are:

1. Capacity of sewerage treatment plant
2. Number of technically qualified staff
3. Expenditure on sewerage treatment plant
4. Power consumption in operating treatment plants

Such data needs to be collected zone wise for last five years so as to build up a trend analysis at the smallest possible unit of measurement.

Step 2 : Understanding Municipal Information system

We need to understand the data maintenance system at various level of maintenance and upgradation of records, logbook keeping. Answers to the following questions need to identified.

- What data they collect?
- How do they collect data?
- Who is responsible for data collection and record keeping?
- At what level do they collect data?
- How do they store data?
- How do they store data?
- Methods of data reporting?
- Accessibility of data?

Step 3 : Collection of Output data

Output data could be defined as services ultimately delivered by the local body to the consumer or the general public at large. Again as in the case of input data, they are not indicators, but help in developing indicators.

Some of the examples of output data are:

1. Amount of sewage collected
2. Sewage pipeline network
3. Amount of sewage treated (Primary /secondary/ tertiary treatment)
4. Sewerage effluents disposed off by dilution

Step 4 : Categorisation of data

The input and output data thus collected would need to be organised into certain categories. These categories are:

1. Service level coverage
2. Service level quality
3. Financial data
4. Manpower
5. Equipment and infrastructure

Step 5 : Performance measurement: Efficiency indicators

Performance measurement of urban local bodies can be done with help of the efficiency indicators. These are indicators which define how well are the input resources being used in delivering the outputs of the services. Therefore the efficiency indicators can be expressed either in the form of ratio of input and output data or in form of percentage.

Some of the examples of efficiency indicators are:

1. Amount of Sewerage collected/ Sewerage generated per day
2. Population catered to by Sewerage pipeline network/ total population
3. % of Sewerage effluents disposed off by dilution/ sewage farming
4. Number of technically qualified staff/ 10 km of pipe length
5. Number of staff/ lakh rupees of the expenditure incurred during a financial year.
6. Length of pipelines silted/10 km of sewer network
7. Expenditure on treatment/ billion kg of Sewerage treated

Step 6 Benchmarking: Outcome indicators

Outcome indicators define ultimate value or benefits of service to users or consumers that they receive reflecting the user needs. They can be represented in form of consumer satisfaction and comparing against benchmarks/ standards available. Some of the potential standards could be.

- Baseline (your own performance trends)
- Benchmark
- Industry standard
- Mandated
- Negotiated

- Customer requirements

Step 7 Assessment of gaps

The benchmarking study would identify the gaps between existing level of service and the standards or desired level of service based on standards or consumer perception and needs. This would help in prioritising policy interventions and setting future policy targets for allocation of funds to priority areas for urgent action.

Step 8 Composite performance assessment

A composite performance index for a higher level of policy makers and decision-makers by giving them combined performance level for a local body. This could cover issues such as service level coverage, service level efficiency and financial performance.

Sources of performance data

- *EXISTING RECORDS*- Workload counts, complaint records, response times. Source capability, amt delivered and billed
- *TIME LOGS*- Resource input information, efficiency improvements, change in volume of consumers. Over years, over different durations of time
- *CONSUMER SURVEYS*- Adequacy, nature of deficiencies, expectations. Adequacy of service
- *TRAINED OBSERVER RATINGS*- For evaluating health of infrastructure. Observation on Leakages
- *SPECIALLY DESIGNED DATA COLLECTION PROCESSES*- For specific needs. Seeking the help of NGOs and RWAs

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List of Indicators for performance measurement

Water Supply

Components of the water supply chain

1. Obtaining water from the source and its storage
2. Water treatment process and its storage
3. Water distribution

Indicators

Service quality

A. QUANTITY

a. Quantity of water supplied per capita per day(For- different seasons, For- different localities)

- Average quantity of water provided per day by pipeline?
- Average quantity of water provided per day by other means?

b. Assessing the suitability of supplies

- Variation factor for peak hourly demand
- Variation factor for peak daily demand
- No of hrs for which a continuous supply is available(For- different seasons, For- different localities)
- Average water pressure for the supply hours

c. Does the service provider have adequate infrastructure for water supplies

- Population catered to by pipeline provisions/ Total population
- Length of pipelength available for use/ Total pipelength provided on ground
- Km of pipe length repaired in an year/ total km. of the pipe length
- Tankers(other infrastructure) available for normal and emergency supplies/ Infrastructure provided for such supplies

d. Analysis of the raw water source- quantity available, quality of source, supply from intake to WTP etc

B. QUALITY

e. Quality of the raw water source/ catchment feeding the city's treatment plant

f. Average quality of water provided(cld define a WQI to describe this)

g. Variations in water quality wrt seasons(the microbial content in particular)

h. Decrease in the WQI during the distribution process/ WQI

i. Does the municipality/ treatment plant have adequate quality control facilities?

- Lab Facilities available for monitoring WQI/ Lab facilities required on regular basis as per departmental protocol
- Lab Facilities available for surveillance audit/ Lab facilities required for surveillance audit as per departmental protocol
- How often is water quality checked?
  (Compare the annual average of supply points, transit points, usage points checked against the standard norms)

C. CUSTOMER SATISFACTION

j. To what extent are customers satisfied by the quantity of water supplied?

  - Quantity received
  - Pressure of supply

- Percentage of customers with functional meter at their end

k. To what extent are customers satisfied with water quality (wrt selected parameters only)?

l. To what extent are customers satisfied with the department's services?

  - Wrt procedures and efficacy while obtaining a new connection
  - Complaint handling system
  - Frequency at which meter reading is taken
  - Opinion on the criteria of charging on flat rate basis
  - Bill collection procedures

D. EFFICIENCY

- Operational

m. Available water resources tapped/ Total water resources available

n. Losses from the intake to the WTP

o. Capacity provided for raw water storage / Capacity required for raw water storage

p. Total water treatment capacity available/ Water treatment capacity required

q. Treatment efficiency(could be the product of all unit operation efficiencies or ultimate efficiency in terms of parameters of the WQI)
r. Capacity provided for treated water storage/ Capacity required for treated water storage
s. Capacity provided (or Inventory) for storage of chemicals at WTP/ Capacity required (or Inventory) for storage of chemicals at WTP
t. Waste sludge storage capacity available/ Waste sludge storage capacity required
u. Sludge waste disposed/ Sludge waste generated
v. %age power availability
w. Losses during the different unit operations of the treatment plant
x. Total losses in the system
y. Leakage losses in the water distribution network
z. Theft losses in the distribution network
aa. Major failures in the water treatment plant/ year
bb. Major failures in the water distribution network/ year
cc. Number of working hrs/ days that the WTP was inoperative due to technical problems
dd. Number of working days/ hours that the distribution system was inoperative due to technical problems)
ee. Time taken to attend a major failure in the treatment plant
ff. Power consumption/ kl of water (supplied/ billed/ treated)
gg. Levels at which meters have been installed in the distribution system (apart from household level)

Financial

hh. Total expenditure of the organisation during a financial year/ billion kiloliters of water delivered or could be
ii. Total expenditure of the organisation during a financial year/ billion kiloliters of water treated
jj. Expenditure on treatment/ billion kiloliters of water treated(or delivered)
kk. Expenditure on delivery/ billion kiloliters of water delivered (or cld be treated)
ll. Expenditure on maintenance/ billion kiloliters of water delivered
mm. Expenditure on operations/ billion kiloliters of water delivered
nn. Revenue generated from all sources/ revenue realised (cld be even over time, expected)

oo. Revenue generated from billing for water/ revenue realised from water billing
pp. Average growth in total revenue expenditure
qq. Excess expenditure incurred/ budgetary allocation
rr. Revenue mobilised from other sources/ total plan outlay
ss. Staff to revenue ratio
tt. Staff to expenditure ratio
uu. Operational debt
vv. Debt recovery over years
ww. Loan repayments
xx. Area wise revenue losses
yy. Budgetary allocation (changes over the years)

Manpower

zz. Number of technically qualified staff/ billion kiloliters of water (supplied or billed)
aaa. Number of lab personnel/ billion kiloliters of water treated
bbb. Number of maintenance personnel/ km of pipelength
ccc. Number of operational personnel/ billion kiloliters of water treated
ddd. Number of administrative personnel/ lakh rupees of the expenditure incurred during a financial year
eee. Number of administrative personnel/ billion kiloliters of water treated

E. OTHER MEASURES TOWARDS ENVIRONMENTAL CONSERVATION

fff. Degree of adoption of specific measures (within the municipality's responsibility) to reduce pollution of water sources
ggg. Degree of adoption of specific measures to eliminate contamination of water supply
hhh. Degree of environmental-friendliness of WTPs (in terms of chemicals used, manner of disposal of pollutants) covered in terms of sludge handling practice
iii. Degree of environmental friendliness of pumping stations (type of fuel, noise) type of fuel is reflected in the %age power availability, noise could be added
jjj. Degree of environmental-friendliness of pipelines
kkk. Degree of adoption of specific measures to reduce water losses

F. ADDITIONALLY INCLUDE discussion on

Development indicators

lll. Ratio of new water connections to the projected/actual requirement of new connections.

mmm. Ratio of new pipes line laid(kms.) to planned extension or required extension of lines.

nnn. Ratio of treatment or storage or source capacity augmented during the year to planned or actual required capacity.

ooo. Ratio of replacement of the pipes against total replacement required.

Others

ppp. Tools presently used for management and monitoring of system

qqq. Power availability status

rrr. Availability of maps of the distribution network

sss. Demand side management

ttt. Norms for Delhi in particular and for different localities, if possible (present norms followed and develop for future, if possible)

uuu. Inequities in water supply

vvv. Future projects in pipeline

www. Debt ratio that is total liabilities of water supply service to total assets of wss

xxx. Net revenue of water supply service to debt servicing of the water supply service

yyy. Capital expenditure on water supply service to total expenditure on water supply service

zzz. Capital Assets to Total Fixed Assets

aaaa. Govt. Grants(if any) to Total Revenue of water supply services.

Municipal Sewerage system

Components of a Sewerage system

1. Network for collecting Sewerage from individual houses to Sewerage treatment plant
2. Primary, secondary and tertiary treatment of Sewerage
3. Disposal of Sewerage effluents

Indicators

Service quality

A. QUANTITY

Q. 1. To what extent does the municipality collect Sewerage?

1. Amount of Sewerage collected/ Sewerage generated per day

Q.2 Does the municipality/ treatment plant have the necessary storage, treatment and disposal capacity?

2. Capacity available for Sewerage well before treatment plant / capacity required
3. Capacity of Sewerage treatment plant / capacity required

Q.3 What is the coverage of the Sewerage collection network?

4. Population catered to by Sewerage pipeline network/ total population
5. Population catered by open drains/ total population

Q.4 How does a Municipal body dispose off the Sewerage effluents?

6. % of Sewerage effluents disposed off by dilution/ sewage farming
7. Distance of Sewerage disposal point from the downstream of usable water
8. Percentage of effluents disposed off directly without treatment

B. QUALITY

Q.1 Does the municipality/ treatment plant have adequate quality control facilities?

9. Lab Facilities available for monitoring WWQI/ Lab facilities required on regular basis as per departmental protocol *(this will have to be made into a measurable indicator)*
10. Total working hrs of the WWTP/365*24
11. Quality of Sewerage based on parameters after treatment/ before treatment
12. Pollution load (BOD) kg/ day of Sewerage treated/ Sewerage generated.

Q.3. How often is quality of Sewerage checked?

13. No of times in a year waste water quality is checked before Sewerage enters treatment plants checked/ standard norms
14. No of times in a year Sewerage quality is checked in treatment plant / standard norms
15. No of times in a year Sewerage quality is checked after Sewerage is treated / standard norms

Q.3 What is the quality of sewage after treatment?

16. % of Sewerage given

- Primary treatment
- Secondary treatment
- Tertiary treatment

17. What is the quality of treated sewerage as compared to the standards

C. CUSTOMER SATISFACTION

Q.1 *To what extent are customers satisfied by the status of maintenance of Sewerage network?*

Q.3 To what extent are customers satisfied with the department's services?

18. Percentage of customers satisfied with response to complaints
19. How frequently are complaints reviewed
20. Percentage redressed in time

Operational efficiency

Q.1 Does the municipality/ treatment plant have adequate staff for the Sewerage system?

21. Number of technically qualified staff/ 10 km of pipe length
22. Number of maintenance personnel/ 10 km of pipe length
23. Number of operational personnel/ 10 km of pipe length
24. Number of lab personnel/ 10 km of pipe length
25. Number of staff/ lakh rupees of the expenditure incurred during a financial year.
26. No.of admin personnel/ No. of operational & lab personnel
27. Power consumption/ amount of sewage treated
28. Manpower available/ number of connections

Q.2. How are technical problems tackled?

29. Number of working days/ hours that the collection system was inoperative due to lack of power supply
30. Km of pipe length repaired/replaced in an year/ total km of the pipe length

Q.3. To what extent is Sewerage network maintained?

31. Frequency of sewer maintenance (seasonal)
32. No of days a sewer is blocked
33. Length of sewer breaks/ 10 km of sewer network
34. Length of pipelines silted/10 km of sewer network
35. Length of pipelines blocked/10 km of sewer network

Financial performance

36. Cost incurred per capita for sewerage system
37. Revenue mobilised from other sources/ total plan outlay
38. Expenditure on treatment/ billion kg of Sewerage treated
39. Expenditure on maintenance/ billion kg of Sewerage collected
40. Expenditure on operations/ billion kg of Sewerage disposed
41. Staff to revenue ratio
42. Staff to expenditure ratio
43. Debt ratio that is total liabilities to total assets
44. Total long term debt to total fund equity invested
45. Net revenue to debt servicing
46. Capital expenditure to total expenditure
47. Loan repayment(debt Seville) to total expenditure

48. Return on Assets that is net revenue/deficit to the total assets
49. Return on equity that is net revenue/deficit to the total equity
50. Net Revenue(surplus) to Total revenue
51. Govt. Grants (if any) to Total Revenue

- What are the future plans to increase capacity to meet future demand
- What are the plans to refurbish the existing system

Municipal solid waste

Components of solid waste system

1. Sources of generation of solid waste
2. Collection of solid waste
3. Segregation of solid waste
4. Transportation of solid waste
5. Treatment of solid waste
6. Disposal of solid waste
7. Recycle and Reuse of solid waste

Indicators

SERVICE QUALITY

QUANTITY

Q What are the current regulations being followed for MSW management?

(1) What are the legal requirements/rules and regulations for MSW management (collection, transportation, treatment and disposal) ?

(2) Does the municipality for waste collection and disposal following any guidelines?

Q What extent does the municipality collect solid waste?

(3) Estimates of average per capita waste generated

(4) Amount of solid waste collected/ total waste generated per day

(5) Average composition of solid waste generated (if any studies have been done)

Q Does the municipality have the necessary facility for collection, transportation, treatment and disposal of solid waste?

(6) Volume available for collection of solid waste at the primary collection centre/ capacity required

(7) Volume available for collection of solid waste at the secondary collection centre /capacity required (Zonewise)

(8) Volume available for collection of solid waste at the landfill site /capacity required

(9) Volume available for storage of segregated solid waste at collection centres and the landfill sites/ capacity required

(10) Number of manpower (various categories) for solid waste collection and transportation/ manpower required (w.r.t. guidelines)

(11) Number of manpower (various categories) for solid waste treatment and disposal / manpower required

(12) Capacity of incineration plant available / capacity required (if Incineration is being practised)

(13) Land available for treatment and disposal of waste/ land required

Q How does a Municipal body dispose off the Solid waste?

(14) % of solid waste disposed off by Composting

(15) % of solid waste disposed off by land disposal

(16) % of solid waste disposed off by incineration

(17) % of solid waste recycled/ reused

Q What is the coverage of the Solid waste collection network?

(18) Population catered to by door to door solid waste collection network/ total population

(19) Population catered to by municipal bins/ total population

(20) Population discharging waste on streets/ open bins/ total population (slums included)

QUALITY

Q Does the municipality/ treatment plant have adequate quality control facilities?

(21) Total working hrs of the incineration treatment plant/365*24

(22) Quality of solid waste based on parameters after treatment/ before treatment (land application criteria, calorific values, composition of waste for composting, nutrient value of waste after composting - Checklist)

Q How efficient and well equipped is the land disposal system?

(23) Has the landfill sites been identified? Was EIA done for identification or not.

(24) Does the land fill sites has leachate collection system and its treatment and disposal facility installed?

(25) What are the facilities available for energy recovery from wastes (eg. Methane recovery system at landfills).

(26) Facilities available for monitoring of the air quality in and around the landfill site and the frequency of meeting the prescribed limits.

(27) Facilities for groundwater quality monitoring (frequency and affect) in and around the existing and proposed landfills.

(28) Type of use of the completed landfill sites (eg garden etc.)

CUSTOMER SATISFACTION

Q To what extent are customers satisfied by the status of solid waste management?

(29) To what extent are customers satisfied with the department's services?

(30) Percentage of customers satisfied with response to complaints

(31) How frequently are complaints reviewed

(32) Percentage redressed in time

(33) Level of transparency and accountability (issues to be detailed in questionnaire survey)

OPERATIONAL EFFICIENCY

Q Does the municipality have adequate staff for the solid waste collection, transportation and disposal ?

(34) Tonnes of waste collected per staff of each category

(35) Number of staff/ lakh rupees of the expenditure incurred during a financial year.

(36) Tonnes of waste collected for treatment and disposal per staff of each category

Q Does the municipality have adequate vehicles and bins for the solid waste collection and transportation?

(37) Number of cement concrete bins/ road length

(38) Number of public bins (movable iron bins) per waste collection depots

(39) Number of bins of various capacities/ capacity required

(40) Number of bins per 1000 tonnes of solid waste

(41) Number of vehicles (various capacities)*number of shifts* capacity of each vehicles/ total tonnes of solid waste for transportation

(42) Percentage of vehicles more than 8 years old

(43) No of vehicles transporting the waste in covered form/ total no of vehicles

(44) Avg. no of vehicles not available / day (information from the workshop)

(45) Avg. no of vehicles not available/ month (information from the workshop)
(46) Methods adopted for loading of solid waste into the vehicles

Q To what extent is the solid waste collected, transported and disposed off?

(47) Frequency of street sweeping (Location specific)
(48) Frequency of transportation of waste from HH to municipal bins
(49) Frequency of transportation of waste from municipal bins to depots
(50) Frequency of transportation of waste from depots to landfill sites or incineration plant

FINANCIAL PERFORMANCE

(51) Per capita expenditure for solid waste management
(52) Average growth in revenue generation
(53) Excess expenditure incurred/ budgetary allocation
(54) Capital expenditure/ capital income
(55) Revenue mobilised from other sources/ total plan outlay
(56) Revenue generated from recycling of waste materials
(57) Total expenditure of the organisation during a financial year/ tonnes of waste collected
(58) Expenditure on collection/ tonnes of waste collected
(59) Expenditure on transportation/ tonnes of waste collected
(60) Expenditure on disposal/ tonnes of waste collected
(61) Staff to revenue ratio
(62) Staff to expenditure ratio

Other Indicators

(63) Degree of segregation at household level
(64) Efforts to reduce the consumption of plastic bags
(65) Efforts for solid waste composting at centralised or neighbourhood level
(66) Efforts for exploring the potential of energy generation from waste
(67) Efforts for resource recovery by recycling
(68) Degree of organic farming being practised
(69) Measures taken to enhance community participation in solid waste management

5

Minutes of workshops

Development of Indicators: Feedback from Stakeholders, Kanpur

The first workshop for obtaining feedback from stakeholders was held on 13 December 2000, at Hotel Landmark, Kanpur.

Comments

Mr G.S. Gundevia

- Emphasized on the growing water problems in the country and Kanpur. He highlighted some of the institutional, regulatory and other weakness of the local bodies in the country in general
- Agreed on the need for developing a framework to judge performance of ULB
- Devolution of power and presence of a regulatory body were highlighted as some of the essential requirements of the present system.
- This Performance measurement system should act as a pressure mechanism for even the citizens to participate and pay up the dues pending towards the authority honestly
- An option of dual mechanism should be thought of for providing subsidy to persons who have the non-capacity to pay for the services being provided.

Mr Vishwakarma

- While complementing on the attempt for PM of local bodies. He suggested that this should not be an academic exercise only, but give some recommendations and results to be implemented by the local body
- Methods of disposal of solid waste and power generation from waste methodologies should be disseminated based on success stories elsewhere

- The limitations and constraints of various modes of solid waste disposal should be highlighted and disseminated to the concerned authorities
- Recommendations to be provided as an outcome of this study should be location specific and not general in nature.

Other Comments

- Various sources of water collection should also form part of the water indicators so as to capture the water quality from various sources
- A mechanism should be in place so as to cross check and verify the data provided by the local bodies

Development of Indicators: Feedback from Stakeholders, Delhi

The first workshop for obtaining feedback from stakeholders was held on 24 January 2001, at Hotel Ambassador, Delhi. The workshop began with the welcome note from Dr Sumeet Saksena, TERI. Dr Leena Srivastava, TERI, followed with her talk on the necessity of urban management in a growing country like India and TERI's active role and initiatives like USERS.

Comments

Dr Ranbir Singh, DJB during his talk stressed on the following:

- Studying the demand patterns in different parts of the city and changes in the same
- Desired that the study should also focus on the level of satisfaction amongst consumers
- He also mentioned of the financial losses in the process of service delivery despite any market competition in India
- Developing database of information on the aspects related to service and the need MIS in these institutions

Mr Ravi Das, MCD highlighted:

- The efforts of the MCD and the infrastructure provided but reflected problems like lack of commitment from safai karamcharis and problem of solid waste in the slum
- MCD's objectives of minimising the GHG emissions, having engineered landfill site and going for generation of energy out of wastes and converting wastes into pallets

- Importance of an active involvement of the NGOs in the process of creating awareness for public co-operation, specifically in the JJ clusters.

This was followed by presentations from TERI on the concept of USERS, Performance Measurement and indicators developed for the services to be studied- Water supply, Sewage and Solid waste. The sessions were very interactive and the key suggestions that emerged included:

- ✓ Modifying the water supply indicators so as to look into the raw water source availability and its quality; demand side management. It was also suggested that the norms for the quantity of water supplied be developed to assist an equitable distribution of water to different parts of the city. Indicators could also be developed to study the availability of power in the water treatment plants and pumping stations and maps for distribution system.
- ✓ Though indicators on Solid waste include focus on land management and availability, the same is not under the purview of MCD's operations. Similarly, solid waste indicators on banning plastics are not in MCD's domain. The indicators should also focus on addressing technologies and their comparison.
- ✓ Suggestions on the sewerage indicators need to be modified to include study on sewer breaks, instances of sewer settling and blockages, pipelength replaced or repaired wrt pipelength provided, maintenance frequency, procedures and sludge utilisation and infrastructure for sewage pumping and power availability.

The workshop ended with a thanks note from Dr Sumeet Saksena.

National Workshop on Indicators for Urban Environment Management: the way forward

Summary and Recommendations

A national workshop on *Indicators for Urban Environment Management: the way forward* was organized by TERI on 20–21 March 2001 at New Delhi. Delivering the keynote address, Mr V Suresh, Chairman and Managing Director, HUDCO, said that in the face of growing urbanization, cities of today face problems of inadequate water supply, improper sanitation, and inadequate solid waste management facilities. Cities should be compared on a level playing field, and any rating should be based on appropriate benchmarks. Further, he stressed that urban environmental agenda adopted by cities should address day-to-day issues, future needs of the city, and unprecedented or unanticipated events such as natural disasters. This holistic approach seems to be lacking in the planning process.

There were two case studies and two methodologies presented at Session I titled *Performance Measurement and Rating*. The comparative performance measurement in Tamil Nadu has been developed to initiate a system for disbursement of funds to municipal bodies in this state based on the efficient utilization of funds in past and future plans. This was followed by a presentation on the USERS project, which highlighted the transfer of performance measurement techniques to municipal officers such that it becomes part of their daily routine. Then the credit agencies presented their systems, which measure the municipality's borrowing credibility and help the public, state government, and other lenders decide on their investment plans in municipal bonds. The recommendations were

- Defining the basics of indicators, such as the need for each indicator, what is to be measured and how, and who would measure and use it
- Importance of participation by all stakeholders such as consumers, service providers, and NGOs in the development and implementation of indicators
- Urgent need to validate both primary and secondary data
- Importance of adoption of performance measurement systems by urban local bodies.

Session II on *Urban Indicators* suggested that the process of designing the indicators should be completely objective and take into account temporal and geographical factors. Otherwise, the interpretation and relevance of indicators may be limited by unclear definition, comparisons across locations and time, and when indicators are affected by multiple factors. The recommendations were

- Indicators need to be well defined, supported by appropriate methodology worksheets, and fine-tuned to reflect their objective
- Data management, especially accounting practices, in urban local bodies should be uniform across the country
- Setting of performance/service-related benchmarks, standards, and norms by the government to be adopted by municipalities across the country.

Session III on *Community Perception and Participation in Managing Indian Cities* cited multiplicity of authority and lack of public information as serious constraints to participation by communities in urban management. The role of people in influencing the two pillars of 'market' and 'state' was discussed as was the difference between 'government audit' and 'people's audit'. Efforts such as report cards have played a strategic role in increasing responsiveness. To enhance public participation, the Guntur Municipal Corporation has developed innovative ways such as a management information system, citizens' charter, opinion polls, and improvement of tax assessment procedures. The presence of strong political will was felt as a necessary ingredient for the success of such endeavours. The recommendations were

- Improved relationship of municipal bodies with consumers by making these bodies consumer-friendly
- Need for a facilitating agency to ensure people's participation
- Informing people and building their capacity for active participation
- Need for industry–government partnerships in evolving urban management strategies and their implementation

Session IV titled *Environmental Management Systems (EMS) and Management Information Systems (MIS) in Urban Local Bodies* saw four presentations. With the support of top management, the environment management system for industrial townships project of development alternatives has implemented EMS systems in four industrial townships, namely BHEL township in Haridwar, Tata Chemicals in Mithapur, IFFCO township in Kasturinagar, and Godrej & Boyce township in Mumbai. The Mirzapur model demonstrated that GIS-based computerized municipal information systems could help to improve the quality of urban services, enhance revenue collection, and develop a systemic information system for data collection, compilation, storage, retrieval, and updating it. Other presentations were on developing MIS for municipals corporations, and developing a framework for municipal information systems by Price Waterhouse Coopers. They all felt the need for municipal information systems to be efficient, accountable, and transparent. The recommendations were

- Municipal information systems to cover sub-systems for service delivery, revenue collection, personnel, finances and they all should be integrated
- Capacity and infrastructure building among municipalities to develop such systems
- Provisions of incentives to employees of urban local bodies for implementing such systems
- Involvement of private sector in developing and implementing such systems
- Resolution of issues such as ownership of databases.

The valedictory address was delivered by Mr N N Ojha, Additional Director General, Defence Estates, Ministry of Defence. Overseeing the functioning of 62 Cantonment Boards and 640 Military Stations all over India, Mr Ojha stressed on the need to adopt universal standards for municipal governance and services. For basic services such as health, water supply, waste management, and sanitation, unless one chooses the ideal situation as the benchmark, it will be difficult to achieve the best possible. It was the same case for planning and infrastructure activities such as zoning regulations. The le of municipal services in India was low in all cities, partly due to lack of funds and partly due to failure to adopt innovative and non-conventional methodologies such as rainwater harvesting, solar energy, biogas, and recycling of waste. In this regard, the private sector and NGOs could be involved based on mutually beneficial partnerships.

Delivering the vote of thanks, Mr Sumeet Saksena, TERI, invited ideas for networking activities, study tours, information dissemination, and EMS for municipalities that could be funded by the USERS project. The workshop had planned to focus on practitioners and was successful in defining the way forward for measuring performance of urban local bodies to a greater extent.

Annexures

A

Literature review

an Indicators

duction

The growing concern over environmental issues in recent decades has evolved into the need for more comprehensive and reliable environmental information. Subsequently, it has also initiated 'State of the Environment' efforts in many countries and by various UN organisation such as the UNEP to provide, analyze and report scientifically – based environmental information. However, neither decision-makers nor the public have been able to easily interpret voluminous quantities of environmental data. In order to simplify information and provide a meaningful communication tool, the Canadian government began developing environmental indicator concept in the 1980s which was followed up by the Dutch government to initiate similar work in 1987. After G-7 economic summit in 1989, the economic powers of the world requested OECD to develop environmental indicators. Pioneering work by the Canadian and Dutch Governments and by the OECD ensued.

International interest in environmental and sustainable development issues hit a new peak in 1992 during the United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro. The declaration of Rio de Janeiro on environment and development emphasized the need for sustainability and respect for precautionary principle to protect the environment. The Agenda 21 called for the Development of Indicators and considers the functions of the indicators in Chapter 40 as follows :

"Indicators of sustainable development need to be developed to provide solid bases for decision making at all levels and to contribute to a self regulating sustainability of integrated environment and development systems."

The working definition of a sustainability indicator differs from an environmental indicator. The former goes beyond an account or measurement of extant environmental conditions in order to identify and measure human impacts on the constituents of the environment in relation to a referent. Hence, a sustainability indicator can serve as a tool to infer the capacity of the local environment and biosphere to sustain human activities over a long period. The hierarchical structure of sustainability indicators can be made up of the following indicators

- Environmental
- Energy
- Social
- Economic
- Institutional

The role of environmental indicators in democratic societies is immense as it can act as a driving force for the electorate to push governments to act on perceived problems. Besides illustrating environmental trend, indicator can be designed to measure how will (or how poorly) the policies protect or restore the environment. The Dutch government made good use of indicators based on strong national goals to curb environmental problems such as ozone depletion, climate change and acid rain.

Since 1981, the Dutch government has published indicators showing how the nations contribution to such problem has changed from one year to the next. When combined with targets for future performance the Dutch citizens were able to analyse how effectively current policies are helping to improve both the Dutch environment and global conditions, and how far they have yet to go.

Environmental Indicators will not be the last word on this new field. On the contrary, it deliberately proposes bold ideas to spark dialogue on which data to compile and how to message a mass of facts in to a handful of meaningful numbers that original whether environmental problems are getting better or worse.

Definitions

The term 'indicator' traces back to the Latin verb *indicare*, meaning to disclose or point out, to announce or make publicly known, or to estimate or put a price on. As commonly understood, an indicator is something that provides a clue to a matter of larger significance or makes perceptible a trend or phenomenon that is not immediately detectable.

Ott (1978) describes indicators as :

> *"Ideally, an index or an indicator is a means devised to reduce a large quantity of data down to its simplest form, retaining essential meaning*

for the questions that are being asked of the data. In short, an index is designed to simplify. In the process of simplification, of course, some information is lost. Hopefully, if the index is designed properly, the lost information will not seriously distort the answer to the question".

The OECD framework (OECD 1993) defines indicator as "*A Parameter or a value derived from parameters, which points to/provides information about/describes the state of a phenomenon/environment/area with a significance extending beyond that directly associated with a parameter value"*. At times the difference between a parameter, indicator or index is not explicitly clear. *A Parameter is property that can be measured or observed. An Index is a set of aggregated or weighed parameters or indicators.*

An indicator is an empirical relationship of reality and not reality itself. Indicators usually translate data and statistics into succinct information that can be readily understood and used by several groups of people including scientists, administrators, politicians, and citizens with a wide range of interests. They can also be used to point out or identify something, which is not immediately visible or audible or perceived in a precise situation. Indicators can be aggregated and attributed weighed values in order to produce composite measures known as indices. Indicators are not criteria or standards but a criterion or a standard is necessary in order to interpret what they mean.

There are two fundamental characteristics of indicators. First, they reduce the number of components and measurements, which are required to give an in-depth account of a condition or situation; indicators and the amount of detail they encompass are limited in scope and content. Second, indicators simplify the communication process by which information is conveyed to diverse groups of users. Indicators can be used to provide cues and directives for more extensive programmes of data collection and analysis. Indicators should not become substitutes for more comprehensive data and information. On the contrary, they should be developed using these kinds of sources. Thus three main functions of indicators are

- Simplification
- Quantification
- Communication

Indicators should not be confused with measurements or statistics. It is common to refer to statistics about the condition of specific components of the environment. Indicators referring to environmental policies need to integrate actors and targets with data and information on the state of environment. A comprehensive environmental indicator would include measurements of environmental conditions, trends over time, the share attributed to different agencies and/or actors, a target and the relationship between it and the measurement.

Indicators can be used for a wide range of purposes. The objectives for using them and the criteria for selecting them should be clearly stated at the outset. The choice of indicators depends on definitions (which are context dependent); their representativeness at a given moment and over time; measurement techniques (which are chosen in terms of level of detail, geographical scale and time period); their compatibility and predictive accuracy; and their purpose, which is related to the objectives and priorities of those who use them. Different uses of environmental indicators have different needs. In the OECD framework for environment indicators there four major categories of use as given below :

- Measurement of environmental performance
- Integration of environmental concerns in sector policies
- Integration of environmental and economic decision-making
- State of Environment reporting

Need for Urban Indicators

Rapid growth and concentration of population in cities has affected their long-term outlook. Poverty, environmental degradation, lack of urban services, degeneration of existing infrastructure, and lack of access to land and adequate shelter have emerged as areas of concern. In determining the causes of urban dysfunction and in monitoring progress toward achieving sustainable cities, it is increasingly necessary to rely on effective tools to analyse the performance of cities, within countries and on a worldwide basis. It is also necessary to have accurate and timely data on key policy variables and performance indicators which measure urban conditions and changes. The formulation and implementation of traditional sectoral approaches applied to urban policies does not lead to optimal results. Incremental improvements (in fields such as housing, employment or transport) are often achieved in tandem with unintended consequences which may include negative impacts on the environmental conditions in cities, the economy, and the health and well-being of citizens. In part, these mixed outcomes are due to the number and complexity of all those factors that policy decision makers need to consider as well as a lack of knowledge about the interrelations between traditional sectors. The recurrent lack of coordination in the field of urban policy can be associated with the following factors :

- The thematic variety and the technical complexity of specific urban problems related to the environment, the economy, health and well-being. Indicators can illustrate this complexity.
- The lack of strategic vision and societal goals shared by politicians, professionals and the public about definition and ordering of priorities. These visions and goals are not solely dependent on scientific knowledge; they should also reflect the perceptions, goals and values of citizens. Hence, both qualitative and quantitative approaches are necessary if used in a complementary way. Indicators could identify most pertinent issues.
- The lack of consensus among specialists. There is no shared conceptual framework, methodological approach or precise instrument for defining, applying and monitoring urban policies

Indicators are also affected by kinds of information that are available or that can be obtained, the pertinence of that information, and its level of abstraction in relation to concrete themes or subjects. Given the complexity of cities, there may be differences, obstacles and even conflicts and groups who use indicators of environmental, health, housing, economic, social and other components of cities. Therefore some degree of co-ordination and standardization is necessary. It is essential to distinguish between indicators of those components of cities that can be measured objectively, and their qualitative dimensions, which include subjective evaluations, founded on perceptions, judgements and values. The latter vary between cultures from group to group in the same society, between individuals and over time.

Uses of Urban Indicators

Urban indicators can serve a number of functions and purposes including (OECD 1997)

- Represent complex conditions and processes in cities in a simplified way in order to promote public awareness
- Assist scientific studies of the components of cities and especially to help improve current understanding of the interrelations between these components
- Facilitate national and international comparisons between cities as well as between neighbourhoods within specific cities
- Serve as data and information for policy decision making by administrators in both the public and private sectors
- Provide internal and external audits of public and private enterprises

- Aid citizen participation especially at the level of urban neighbourhoods
- Help identify and diagnose recent trends in cities including dysfunction's and perceived risks
- Promote the definition and monitoring of innovative urban policies
- Help anticipate urban developments and encourage pro-active policies
- Promote public understanding by indicating goals and achievements

The major group of stakeholders who may benefit from the use of indicators are

- Residents
- Mayors and city managers
- Commercial and business organisations
- National government agencies and parliaments
- Sectoral agencies
- NGOs or CBOs
- External support agencies

Each of these users will have a wide or narrow focus on the urban sector, but all will be involved directly or indirectly in developing policies, programmes and projects for urban development and can use indicators to help measure progress within their interest areas and to compare such progress with other cities or countries.

Historical developments since 1970s

OECD Report

The OECD report titled "Urban Environmental Indicators" published in 1978 has become a benchmark in the development of indicators, a widely used reference for measuring housing and environmental conditions in urban areas. This publication focused on housing, services and employment, and the ambient environment and nuisances. Social and cultural dimensions of cities were also considered but not developed in this document. Except for the absence of health indicators, the interpretation of indicators in this document reflected the most common approaches applied during the 1970s. These can be characterized by an overriding emphasis on quantification and the use of available data and statistics. Then, there was a widely shared concern for measurement and statistics, whereas little attention was given to understanding the complexity of cities and the interrelations between components. The majority of contributions in the field of housing and urban environmental indicators during the 1970s can be considered innovative in many respects, but they were generally unrelated to the precise demands of urban policy decision-makers, public institutions and private enterprises. This shortcoming underlines the need to understand the context in which indicators are used because indicators are only meaningful and pertinent in relation to specific goals and objectives of those who formulate them, those who monitor and use them, and those who interpret them in precise localities.

City of Rennes Conference

The international conference on "Indicators for Urban Policies" hosted by city of Rennes in April 1995 was the first occasion for the exchange of information and experience between civic authorities, national agencies and international organizations who support the use of urban indicators. Representatives of these institutions included politicians, administrators and scientists who participated with academics, professionals and policy decision-makers from diverse disciplines and professions. This conference was the first formal occasion at which participants considered the joint uses of environmental, health, housing, economic, social and energy indicators. It was also the first forum that enabled observers to take stock and then consider what developments had occurred since the 1970s, in uses of indicators for urban policies. The set of papers presented at the Conference in Rennes share a number of common themes that extend across traditional sectoral boundaries and administrative levels. These include :

- The growing roles for local government in urban and environmental spheres;plua the decentralisation of services within urban agglomerations, are creating new demands for policy knowledge
- Increasing attention to value for money in public services and policy spending are leading to a demand for new information on inputs and outputs
- Targeting of scarce public funds in recent years means that updated, localised information on the extent and location of urban conditions and problems are necessary
- Integrated approaches to environmental policies and urban regeneration need new, relevant indicators and innovative participative styles of urban governance.
- New technologies in processing, storing, cross-referencing and dissemination data improve the capacity of cities to meet new demands for indicators and other forms of information and data.

The Conference in Rennes demonstrated clearly that urban indicators are at the forefront of local and national government concerns to improve the practice of urban policy.

UNCHS Urban Indicators Programme

The Urban Indicators Programme of UNCHS (Habitat) was established to address the urgent global need to improve the base of urban knowledge by helping countries and cities design, collect and apply policy-oriented indicators data. The programme started in 1988 as the Housing Urban Indicators Programme, a joint Habitat/World Bank initiative, in response to the objectives of the Global Strategy to the Year 2000. The programme collected policy-sensitive housing indicators in principal cities of 53 countries during 1991-92. The success of housing urban indicators programme provided the impetus to develop a set of urban indicators designed to capture essential information on cities and to monitor the performance of the urban domain in relation to desired policy goals. The critical role for urban indicators is not only to assess human settlement conditions and sustainability, but also to assist in policy formulation and in monitoring overall urban performance. In 1993, the programme moved toward the broader issue of sustainable urban development, responding to a major theme chosen for the 1996 Habitat II conference : "Sustainable Human Settlements in an Urbanizing World". Following a meeting of experts in Nairobi in January 1994, an extensive set of urban indicators was selected covering, in addition to housing, a wide range of policy issues. These were endorsed in April 1994 at the first substantive session of the Preparatory Committee for the Habitat II conference. UNCHS (Habitat), as the secretariat to the conference, was instructed to support the collection of indicators and to provide guidelines for their inclusion in the national reports that countries would prepare for the conference. Indicators formed an integral part of the preparatory process for Habitat II. A list of 46 key indicators was endorsed by the Preparatory Committee as the minimum set of indicators to be collected by each country in preparation for the Conference. The results were presented by countries at Istanbul in their national reports. By the time of the Istanbul Conference, in June 1996, data on key indicators had been received from 221 cities in 104 countries. These data are now being verified and entered into a global database by UNCHS (Habitat). The UNCHS (Habitat) decided to establish a Global Urban Observatory (GUO) to permit comparative international evaluation of progress in meeting the aims of the Habitat Agenda and to draw attention to and provide information on human settlements trends and conditions worldwide. The development objective of the GUO is to help governments, local authorities and other partners improve their knowledge of human settlements and their capacity to formulate and adopt effective and appropriate policies and strategies for making settlements more sustainable.

OECD Environmental Indicators

The work programme of the OECD on environmental indicators has been well documented and published. The OECD has stated that there is no definitive set of environmental indicators. Rather, indicators should be selected according to their pertinence for the purposes their users want to them to serve in a precise situation. Nonetheless, it is recognized that there is a need to co-ordinate the initiatives of OECD member's countries, to prepare guidelines for the use of environmental indicators, and then formulate and apply a core set of selected and aggregated indicators. This approach is meant to lead the application of a limited number of indicators for comparisons between countries. In principle, indicators are considered as sets of tools, amongst others, to aid policy decision-making.

The contribution of the OECD has been important in clarifying the distinction between descriptive and performance indicators. Whereas descriptive indicators are derived from measures of extant conditions, performance indicators aim to identify the correspondence or lack of it, between ambient conditions and a stated goal, threshold or policy. A concise set of criteria for the selection of indicators for specific purposes has been developed and these criteria are given below:

Criteria for Indicator Selection

Policy relevance and utility of users

An environmental indicator should

- Provide a representative picture of environmental conditions, pressures on the environment or society responses
- Be simple, easy to interpret and able show trends over time
- Be responsive to changes in the environment and related human activities
- Provide a basis for international comparisons
- Be either national in scope or applicable to regional environmental issues of national significance
- Have a threshold or reference value against which to compare it so that users are able to assess the significance of the values associated with it

Analytical soundness

An environmental indicator should

- Be theoreticallyn well founded in technical and scientific terms
- Be based on international standards and international consensus about its validity
- Lend itself to being linked to economic models, forecasting and information systems

Measurability

The data required to support the indicators should be

- Readily available or made available at a reasonable cost/benefit ratio
- Adequately documented and of known quality
- Updated at regular intervals in accordance with reliable procedures

The OECD work programme has also adopted the Pressure-State-Response framework for developing environmental themes, and issues by sector. For each theme a pressure, state and response indicator can be chosen as shown in Figure 1. Three main classes of indicators have been developed first a core set of indicators that can be used to assess and monitor components of the environment; second sectoral indicators that consider the integration of environmental concerns into sectoral policies; third, indicators that promote the accounting of resources for national environmental performance reviews.

Types of environmental indicators

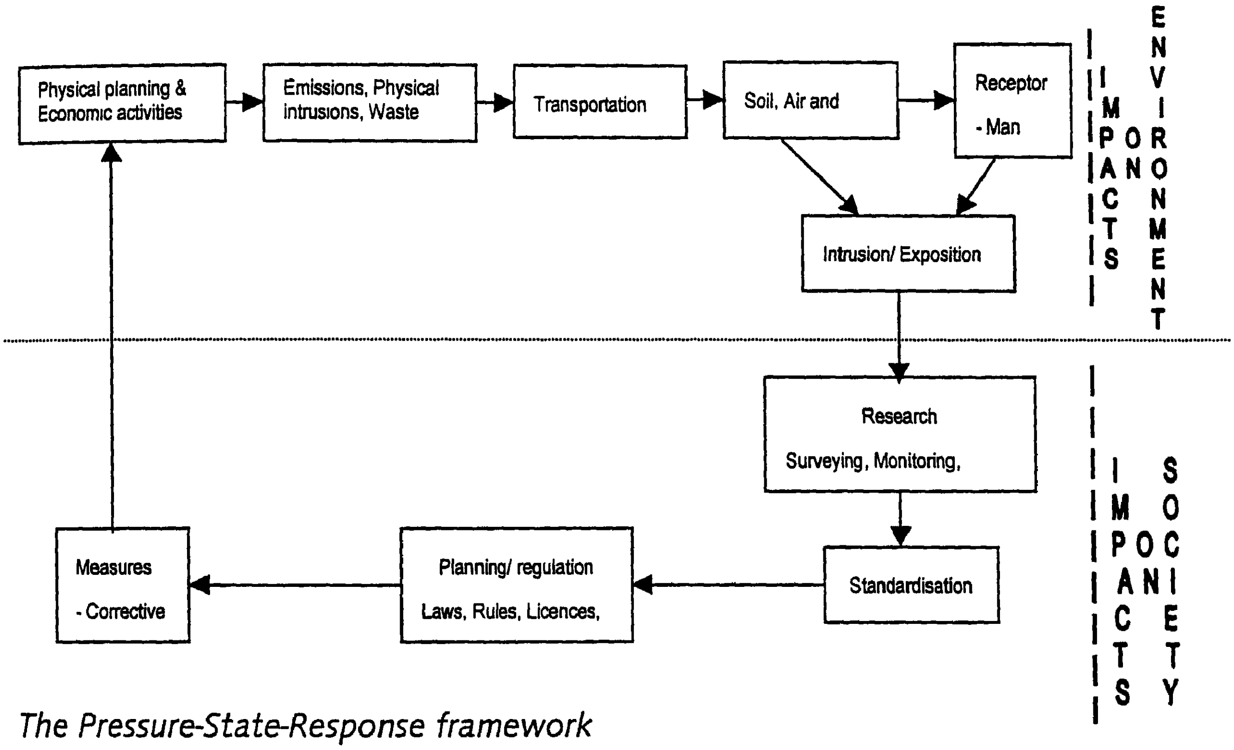
All human actions have environmental repercussions necessitating a requirement of different decision making patterns and consequently a need for different type of indicators. The environmental policy as a result follows two approaches-

1. Improve the quality of environment by means of regulation and
2. Encourage an environment friendly behavior by changing the mentality and behavior of the common masses.

Models have been developed based on the needs of such an integrated environmental policy. These focus on human impact and the indicators expose links between quality aspects and socio-economic changes.

Environmental cycle

This model depicts a casual chain of how sources cause emissions leading to concentrations in the living environment; the ways in which receptor is exposed and in turn its effect on different sectors of the society.


Physical planning & Economic activities
Emissions, Physical intrusions, Waste
Transportation
Soil, Air and
Receptor - Man
Intrusion/ Exposition
Research Surveying, Monitoring,
Standardisation
Planning/ regulation Laws, Rules, Licences,
Measures - Corrective
IMPACTS ON ENVIRONMENT
IMPACTS ON SOCIETY

The Pressure-State-Response framework

The Pressure-State-Response framework is based on the concept of causality. Human products and processes exert pressures on the environment and change its state by using resources and creating all kinds of wastes. Societies may respond to these changes using environmental, economic legal and other sectoral policies. The latter form a feedback to human products and processes. Although this framework does propose relationships between the components of human ecosystems, it assumes that these relationships are linear and, therefore, overlooks the complexity of these ecosystems. Indeed, the Pressure-State-Response framework was originally formulated to present sets of environmental indicators rather than serve as an analytical framework.

The three main classes of environmental indicators that are applicable to the Pressure-State-Response framework are:

Indicators of environmental pressures or stresses

This class of indicators shows the impacts of human products and processes on environmental conditions. A distinction can be made between fixed and mobile sources (e.g. factories and lorries) and their actual emissions. Another distinction can be made between impacts from these sets of sources and those stemming from the use of raw materials, energy or the discharge of wastes. Pressure indicators can be applied to gauge developments of activities of individual firms or companies, whole branches of industry, or economic sectors as well as socio-demographic trends.

Indicators of environmental conditions

These concern the state or quality of environmental components over time. Terms such as environmental quality indicators, state indicators and effect indicators are commonly used for this class. These indicators of environmental conditions and ecological processes ought to be distinguished from environmental pressure indicators. Given the cost of measuring environmental conditions, it is not uncommon for environmental pressure to serve as substitutes for them.

Indicators of societal responses

This class of environmental indicators is meant to show to what extent a society or a community is responding to environmental pressures. Both public and private sector responses should be considered. Public sector responses include means and measures such as legislation, environmental abatement expenditure, taxation, standardisation and the promotion of public awareness by the dissemination of information. Private sector responses include reduced consumption of non-renewable resources and toxic substances, and the recycling of wastes. This class of environmental indicators is the least developed to date. Future research is needed and two issues ought to be addressed. First, the distinction between indicators of environmental pressures and those of societal responses are not always precise. In principle, the latter should indicate human initiatives in relation to specific environmental problems. Second, given that indicators are quantitative constructs, societal response indicators are restricted to those which can be quantified. Hence rules and regulations are not included, but they could be addressed in supplementary information by listing infractions of legislation.

The Pressure-State-Response framework is independent of those specific themes or issues that can also be addressed using indicators. For example, environmental performance indicators stem from an issues specific approach (see below). The Pressure-State-Response framework can be applied to traditional sectors such that environmental pressure indicators show impacts exerted by agriculture, industry and transportation. Likewise, societal response indicators can show government responses in comparison to those of the private business sector (including agriculture and transportation, etc.). These applications show that this framework can be used to integrate environmental policies into other sectors. Given the broad scope of this framework it is important to note that there are few applications of it at the city or local government level. Recent research in the Canton of Geneva, Switzerland, however, is one exception worthy of comment.

Efforts in the Development of Urban Indicators

European Commission's Expert Group on the Urban Environment

The European Commission established an Expert Group on the Urban Environment in 1991. One initiative of this group is the Sustainable Cities Project. [52] The Charter of European Cities and Towns Towards Sustainability (The Aalborg Charter) approved on 27th March 1994, states that policy decision-making in the broad sphere of urban planning and management should be based on different types of indicators including those of environmental quality, urban patterns and processes, and the sustainability of urban systems (Table 3).

Studies of the Expert Group of uses of indicators as tools for land use planning have focused on the spatial distribution of urban populations; mobility; types of land cover including derelict lands; and urban renewal.

According to a recent publication of the European Commission, three practical measures help achieve sustainable development. These are: optimum reuse and recycling thereby avoiding wastage and preventing depletion of the natural resource stock; the rationalisation of the production and consumption of energy; and changes to the consumption and behaviour patterns of society. [53] This interpretation considers environmental and economic components of human ecosystems more than social ones. It is noteworthy that there is no mention of the availability and affordability of housing; or the provision of and access to health, medical and community welfare services; or of the incidence of urban pathologies, such as social and spatial deprivation and exclusion which can lead to delinquency, vandalism, fear to crime, riots and warfare.

European Sustainability Index Project

In 1993, the International Institute for the Urban Environment received a contract from the European Commission Directorate-General XI to develop a reference framework and a set of urban indicators. 54 In contrast to the formulation of a standardised set of global urban indicators applicable to all cities, the Institute has developed a compact index for application in European cities as well as for comparisons between them. Three main sets of themes have been considered:

- The ambient environmental conditions in cities and their impacts on human health
- The metabolism of urban products, conditions and processes and related impacts on natural resources and more global ecosystems
- The built urban environment and its impacts on health, resource consumption and ecosystems at local and more global scales

Attributes	Indicators	
	A. Indicators of urban patterns	
1. Urban population	a) Population	▪ Number of inhabitants in city (1) in conurbation (2)
	b) Population density	▪ Population per km^2 (3) ▪ Area by density classes (4)
2. Urban land cover	a) Total Area	▪ Area in km^2 (5)
	b) Total built-up area	▪ Area in km^2 (6)
	c) Open area	▪ Area in km^2 (8) ▪ % green areas (9) ▪ % water (10)
	d) Transportation network	▪ Motorway length (km) (11) ▪ Railway length (km) (12) ▪ % of total urban area (13)
3. Derelict areas	a) Total area	▪ Area in km^2 (14) ▪ % of total area (15)
4. Urban renewal areas	a) Total area	▪ Area in km (16) ▪ % of total urban area (17)
5. Urban mobility	a) Modal split	▪ Number (18) and average length (19) of trips in km per inhabitant per mode of transportation per day
	b) Commuting patterns	▪ Number of commuters into and out of conurbation (20) ▪ As % of the urban population (21)

Attributes	Indicators	
	c) Traffic volumes	▪ Total (22) and inflow / outflow (23) in vehicle-kms ▪ (24) number of vehicles on main routes
	B. Indicators or urban flows	
6. Water	a) Water consumption	▪ Consumption in litres per inhabitant per day (25) ▪ % of ground water resources in total water supply (26)
	b) Waste water	▪ % of dwellings connected to a sewage system (27) ▪ Number (28) and capacity (29) of treatment plants by type of treatment
7. Energy	a) Energy consumption	▪ Electricity use in Gwh per year (30) ▪ Energy use by fuel type and sector (31)
	b) Energy production plants	▪ Number (32) and type (33) of power and heating plants in the conurbation
8. Materials and products	a) Transportation of goods	▪ Quantity of goods moved into and out of the city in kg per capita per year (34)
	C. Indicators of urban environmental quality	
9. Waste	a) Waste production	▪ Amount of solid waste collected in tonnes per inhabitant per year (35) ▪ Composition of waste (36)
	b) Recycling	▪ % of waste recycled per fraction (37)
	c) Waste treatment and disposal incinerated	▪ Number of incineration (38) and volume (39) ▪ Number of landfills (40) and volume (41) received by waste types

Attributes	Indicators	
10. Quality of water	a) Drinking water	▪ Number days per year that the WHO drinking water standards are exceeded (42)
	b) Surface water	▪ O_2 concentration of urban surface water in mg per litre (43) ▪ Number of days pH is > 9 or < 6 (44)
11. Quality of air	a) Long Term: SO_2 + TSP concentration: O_3-SO_2 TSP	▪ Annual mean concentration (45). SO_2 (47), TSP (48)
12. Acoustic quality	a) Exposure of noise (inhabitant per time period)	▪ Exposure to noise above 65 dB (49) and above 75 dB (50)
13. Traffic safety	a) Fatalities and casualties	▪ Number of people killed (51) and injured (52) in traffic accidents per 10000 inhabitants
14. Housing quality	a) Average floor area per person	▪ M^2 per person (53)
15. Accessibility of green space	a) Proximity to urban green areas	▪ Percentage of people within 15 minutes walking distance of urban green areas (54)
16. Quality of urban wildlife	a) Number of bird species	▪ Number of bird species (55)

Source : European Environment Agency

Notes : Numbers in parenthesis are indicator numbers

In this project a set of urban indicators has been used to describe and analyse trends in about 50 cities and towns in Eastern and Western Europe. A tripartite, interrelated set of Area-Specific, Base and Core indicators has been developed and tested.

Sustainable Seattle Project

Sustainable Seattle is a volunteer network and civic forum, founded in 1991, with the aim of improving cultural, economic, environmental and social vitality. The aim of the first project of Sustainable Seattle was the development of a set of indicators using an integrated approach combining a public participation process with research carried out by an Indicator Task team of 30 persons. A civic panel of about 150 selected persons reviewed this work. This panel identified 99 indicators for Seattle, which were refined to 40 key indicators. These indicators are meant to raise public awareness, identify achievable goals, make long term trends visible, help individuals and the community to establish priorities, serve as foundation for action, explain what sustainability means and institutionalize the concept over long-term. A comprehensive development plan and a strategy for the city of Seattle and its nearby region have been developed subsequently.

The sustainable Seattle indicators of a sustainable community

Environment

- Wild salmon runs through local streams
- Biodiversity in the region (specific indicator species to be identified and indicator to be developed)
- Number of good air quality days per year, as reported by the Pollutant Standard Index
- Amount of topsoil lost in King County
- Acres of wetlands remaining in King County
- Percentage of Seattle streets meeting 'pedestrian friendly' criteria

Population and resources

- Total population of King County (with annual growth rate)
- Gallons of water consumed per capita
- Tons of solid waste generated and recycled per capita per year
- Vehicle miles travelled per capita and gasoline consumption per capita
- Renewable and non-renewable energy (in BTUs) consumed per capita
- Acres of land per capita for a range of land uses (residential, commercial, open space, transportation and wilderness)
- Amount of food grown in Washington, food exports and food imports
- Emergency room use for non-emergency purposes

Economy

- Percentage of employment concentrated in the top ten employees
- Hours of paid employment at the average wage required to support basic needs
- Real unemployment, including discouraged workers with differentiation by ethnicity and gender
- Distribution of personal income, with differentiation by ethnicity and gender
- Average savings rate per household

- Reliance on renewable or local resources in the economy (specific indicator to be developed)
- Percentage of children living in poverty
- Housing affordability gap
- Health care expenditure per capita

Culture and society

- Percentage of infants born with low birthweight (including desegregation by ethnicity)
- Ethnic diversity of teaching staff in the arts of elementary and secondary schools
- Percent of parent/guardian population that is involved in school activities
- Juvenile crime rate
- Percent of youth participating in some form of community service
- Percent of enrolled 9th graders who graduate from high school (by ethnicity, gender and income level)
- Percent of population voting in odd year (local) primary education
- Adult literacy rate
- Average numbers of neighbours the average citizen reports knowing by name
- Equitable treatment in the justice system
- Ratio of money spent on drug and alcohol prevention and treatment to money spent on incarceration for drug and alcohol related items
- Percentage of population that gardens
- Usage rates for libraries and community centres
- Public participation in the arts
- Percent of adult population donating time to community service
- Individual sense of well-being

Environment Performance Indicators and Benchmarking

ISO 14031 describes two general categories of indicators to support the implementation of Environmental Performance Evaluation(EPE):

- environmental performance indicators (EPIs`; and
- environmental condition indicators (ECIs).

Environmental Performance Indicators are tools to assess the relevant outputs or outcomes or service levels of each activity. They are descriptions of the operational processes wrt resources needed vis a vis resources consumed to meet the *performance goals*. As per ISO standard EPIs have been categorised into two - Management Performance Indicators (MPI) and Operational Performance Indicators (OPI).

Management performance indicators (MPIs) are a type of EPI, and they provide information to support the evaluation of management efforts to influence the environmental performance of the organization's operations. MPIs relate to the policy, people, planning activities, practices, procedures, decisions and actions at all levels of the organization.

Operational performance indicators (OPIs) are a type of EPI, and they provide management with information on the environmental performance of the organization's operations. OPIs relate to:

- inputs: materials (e.g., processed, recycled, reused, or raw materials; natural resources), energy and services;
- the supply of inputs to the organization's operations (e.g., the method of delivery of raw materials);
- the design, installation, operation (including emergency events and non-routine operation), and maintenance of the physical facilities and equipment of the organization.
- outputs: products (e.g., main products, by-products, recycled and reused materials), services, wastes, (e.g., solid, liquid, hazardous, non-hazardous, recyclable, reusable), and emissions (e.g., emissions to air, effluents to water or land, noise, vibration, heat, radiation, light) resulting from the organization's operations;
- the delivery of outputs resulting from the organization's operations (e.g., method of transportation of finished products to customers).

ECIs provide information about the local, regional, national or global condition of the environment (e.g., kilograms per liter of sulfur dioxide in ambient air measured at the facility's fenceline). This information may help an organization to better understand the actual impact or potential impact of its environmental aspects, and thus assist in the planning and implementation of EPE. ECIs are intended to provide a context for the organization to understand its EPIs and OPIs.

Performance Measurement & Benchmarks

Introduction

Performance measurement is an emerging buzzword in the context of local governance systems and institutional reform. In order to measure performance it is necessary to be able to define what is meant by performance. But the 'performance' of a local authority, or even of a single service, is a complex and multi-faceted concept and the inability to or describe it has in the past been one of the blockages to the development of measures (Rogers 1990). Several approaches have been developed to address this gap, some of which will be discussed later in this chapter.

Where do we stand in relation to others delivering a particular program or service? Who is doing something out here better than we are? What are they doing that we are not, and how can we change to mirror their performance? Getting quantitative answers to these questions is the essence of *performance measurement* i.e. the determination of how effectively and efficiently a jurisdiction is delivering the public service of interest. (Fischer 1994)

A performance measure is virtually value-less if it appears in the form of an isolated, abstract number. Its value comes in comparison with a relevant peg i.e. a benchmark. It is important here to note the difference between *performance measurement and benchmarking*, terms which people often use interchangeably. The initial work done to specify and gather data on the criteria that account for the performance of a program or service is known as "performance measurement." Knowing the factors that are important in effectively performing a particular service or function is the foundation of benchmarking practice. Benchmarking per se is the next step, which is taken to discover what those identified as having best practices are doing that you are not doing. (Fischer 1994)

Performance measurement lets you quantify whatever variables are selected as underlying the performance of a particular service. On the other hand, benchmarking per se is a general means of comparison, the starting point for finding where changes are needed or not needed. Simply put, performance measurement is a planning tool, while benchmarking is an improvement tool. The practice is not an end in itself, nor is it an exact science. At best, both performance measurement and benchmarking are rough guides with which to begin the improvement process. (Fischer 1994)

A further distinction can be drawn between *benchmarks and benchmarking*. Comparing local performance statistics with selected benchmarks is not the same as full-fledged corporate style benchmarking. Benchmarking entails the analysis of performance gaps between one's own organisation and best-in-class performers, the identification of process differences that account for the gap, and the adaptation of key processes for implementation in one's own organisation in an effort to close the gap. A simple comparison of performance with selected municipal benchmarks is more limited but also less expensive and more practical for a general assessment of a broad range of functions. Such a comparison places local performance in context and, where major performance gaps are detected, may suggest that need for additional analysis, perhaps leading to a full-scale benchmarking project.

In this chapter, the term benchmarks has been used in the simpler sense, and not the detailed exhaustive comparison exercise implied by benchmarking. (Ammons 1996)

Drivers / Pressures

Two of the main drivers for the growing popularity of performance measurement for local authorities, are the tightening of budgetary resources, and the growing pressure from citizens who are frustrated and want an effective and responsive government. At a broader, systemic level however, a combination of factors have driven this shift. (Ammons 1996)

- *Accountability.* Managers in top-performing organisations from their subordinates and in turn, expect to be held accountable by their organisational superiors. Performance measures document what was done by various departments or units and, ideally, how well it was done and what difference it made. Through such documentation, outstanding departments and entire municipalities earn the trust of their clients and citizens as they demonstrate a good return in service provided for tax money received.
- *Planning & Budgeting.* Cities with an objective inventory of the condition of public services and facilities, a clear sense of service preferences among their citizens, and knowledge of the cost of providing a unit of service at a given level are better equipped to plan their community's future and to budget for that future. Again, performance measurement - incorporating unit costs and indicators of citizen demand or preference - is key.
- *Operational Improvement.* Municipalities that measure performance are more likely to detect operational deficiencies at an early stage. Furthermore, performance records enhance their ability to confirm the effectiveness of corrective actions.
- *Program Evaluation/ MBO/ Performance Appraisal.* Carefully developed performance measures often provide valuable information for the systematic evaluation of program effectiveness. Measurement-by-objectives (MBO) programs and pay-for-performance systems for managerial employees, where they exist, typically are tied to performance measures. In some cases, employee performance appraisals or other forms of systematic performance feedback have been based, at least in part, on individual performance relative to established measures.
- *Reallocation of Resources.* A clear indication of program effectiveness and unit costs - in essence, a scorecard on tax

Principles/ Approaches

In order to define performance measures, need to answer four questions successfully. They are:

- Why do you want to measure? - What are the purposes of measurement?
- Who are the measures for? - Who is meant to use them?
- What do you want to measure? - What characteristics of performance are important?
- How are you going to measure? - What methods should be used for collecting, analysing and presenting data?

However, given the multiplicity of roles and responsibilities assigned to a local authority, it is often difficult to answer these questions with a degree of clarity. In order to address this problem, a methodology or framework was developed for describing performance, in terms of the three E's. Performance was defined as having three aspects - Economy, Efficiency and Effectiveness.

Institutional and regulatory structure for urban local bodies

Introduction

Urbanization in India has been rapid, unplanned, especially with respect to the environment. High rate of migration into the cities (both rural-urban and urban-urban), increasing number of resident population, and lack of long term planning by the civic authorities to cater to the basic needs of water, energy and housing have made the cities potent to live in.

At the basic level, these problems are localized and require attention through prioritized planning at the local level. In an urban set up, most of the environmental problems (air/water/noise pollution, land degradation, health, etc.) relate to the level of services and infrastructure provided to the community. In turn, the provision of this services/infrastructure is primarily a function of the management of finances, implementation, operation & maintenance, which is the responsibility of the local bodies. Thus, it is essential that the functions of the local bodies through various management (or institutional), legal and financial mechanisms be strengthened to help disburse their responsibilities toward the urban environment.

Pre 74th Amendment Structure of urban local Government in India

Introduction

India has a three level system of government, the Union, the states and the local government. The constitution of India prescribes the legislative, administrative and the financial powers of the Union and states only. It does not specify anything as far as local government is concerned. The structure of government in the pre 74th Amendment scenario is given in the figure 1 below.

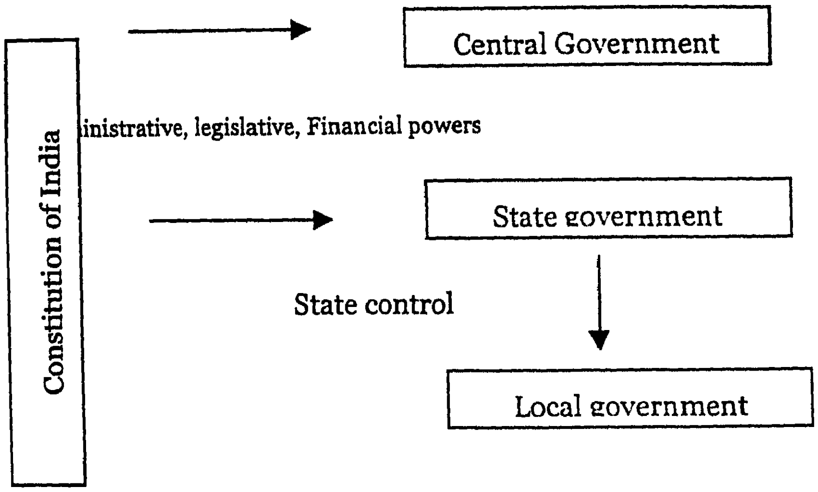


Figure 1: Pre 74th amendment urban government structure

Municipal corporations all over the country have been assigned by their respective governments a long list of functions. The state government defined the obligatory and discretionary functions. The obligatory functions could be classified into four main types-public health, public safety and convenience, medical relief and public works.

The municipal law defined the Local government exclusively as a State subject, and the structures and powers of the urban local bodies to be enacted by the concerned state. The local government thus does not enjoy any constitutional status of its own but have statutory status under the state laws. Thus the governance of the local urban areas was directly within the jurisdiction of the state government with local municipal bodies under the direct control of the State Government.

Urban Services

Water supply, sewerage and municipal solid waste are the services under the review of the project. The institutional and regulatory structure available for delivering these services is described in the following sections.

Institutional structure

The municipal bodies under the advice of the State government were managing a few functions related to water supply and drainage. To perform these functions the municipal bodies had an engineering wing essentially looking after the maintenance of water supply, drainage and sewage. The Solid waste was under the Public health and sanitation department, which included garbage collection. Managing solid waste in most of the municipal corporations was just restricted to appointing sweepers on the street, as solid waste management was not a well-defined function of the municipal body. However the State s also had a water supply and sewerage board, which performed the function of supplying water and disposal of sewage from the cities.

Regulatory structure

The municipal acts contained a few provisions dealing with the development and regulatory functions in relation to water supply and drainage and empowered the State government to make rules for appointment of an adhoc committee to advice the municipal boards. Whereas the water supply and sewerage acts made provision of water and disposal of sewerage as obligatory functions of the boards.

For Kanpur and Delhi, the institutions and the related legislation for proving the urban basic services are given in the table 1 below.

Table 1: Relevant institutions and legislation for Kanpur and Delhi

Institutions		*Relevant acts*	
Kanpur	Delhi	Kanpur	Delhi
Kanpur Municipal corporation	Delhi Municipal corporation	U.P. Nagar nigam Palika adhiniyam 1959	MCD, Act 1957
Water supply and sewage board	Delhi water supply and sewerage board	U.P. water supply and sewerage act, 1975	
U.P. State pollution	Delhi Pollution	The Water Act,1974	The Water Act,1974

control board	control committee

Issues

Therefore with the institutional and regulatory structure raising issues of multiplicity of institutions and organisations and unclear designation of responsibilities and well-defined functions, the quality of these basic urban services became worse leading to inefficient performance of their functions resulting in environment degradation. Thus a need to decentralise the powers and increase the functional areas within the jurisdiction of the municipal body was felt, which was addressed through the 74th Constitutional Amendment.

Rationale for the 74th Amendment

Many programmes were launched essentially focussing on community development in the post independence scenario. These programs failed due to lack of popular initiatives and absence of local bodies in implementing such schemes. A number of committees were set up so as to look into such problems. Notable amongst them was Naik, Panikh and Blawant Rai Mehta committee report. One of the major reasons identified for the local bodies' inability to perform their functions and responsibilities effectively by the Balwantrai Mehta committee in 1957 was the inefficient devolution of resources from the state to the local government. The committee felt that inadequate powers with the local government and lack of financial resources were the main causes for the inefficient working of local bodies leading to poor implementation of development strategies. It was therefore recommended to give more democratic and decentralised powers to these local governments. The year 1992 is an important milestone in the evolution of local governments in India. The parliament enacted the 73rd Amendment (for rural areas) and 74th Amendment (for urban areas). The Acts introduced some fundamental changes in the system of local governance.

Urban local government after the 74th Amendment

The seventy-fourth constitutional amendment has rationalised and given empowerment to the urban bodies. The salient features of the amendment act are:

Institutional

Under the institutional restructuring, the constitution and the composition of the municipal bodies were changed. Additional committees were set up for proper planning from the district level to metropolitan level.

Constitution of municipalities

The forms of urban bodies have now been restricted to three types. For example till 1992, three separate statutes governed the urban bodies in Uttar Pradesh. The U.P municipalities' act, 1916 governed the functioning of the municipalities and notified area committees numbering 229 and 35 respectively. The U.P. town area act, 1914 applied to 417 town area committees while U.P. Nagar mahapalika adhiniyam, 1959 governed the 8 municipal corporations of the state. Consequently on the enforcement of the seventy fourth constitutional amendment, the urban local bodies of the state are reclassified as 11 Nagar Nigams (municipal corporations), 226 Nagar Palika Parishads and 444 Nagar Panchayats which is constituted for a transitional area.

Composition and duration of municipalities

As regards the composition or the membership of municipalities, the constitutional amendment act provides that every municipality shall have two categories of councilors. viz. directly elected councillors and nominated councillors. Earlier the state government nominated the councillors. The number of elected councillors varies according to the population and the size of the territorial area. In the case of nominated councillors, the state law needed to specify the conditions and procedures for nomination of such representatives. Besides this, MLAs, MLCs and MPs representing a constituency comprising wholly or partly of a municipal area, are to be represented on the municipality. These co-opted members however do not have the right to vote. Every Municipality, unless sooner dissolved under any law for the time being in force, shall continue for five years from the date appointed for its first meeting.

Ward committees

In order to provide for increased popular participation in the urban governance and bringing the municipal government closer to the people, Article 243S, provides for constitution of ward committees in all municipalities which have population of more than 3 lakhs.

Committee for district planning

There shall be constituted in every State at the district level a District Planning Committee to consolidate the plans prepared by the Panchayats and the Municipalities in the district and to prepare a draft development plan for the district as a whole. The constitution of these committees would be governed by the legislative of a state.

Committee for metropolitan planning

As per Article 243ZE,there shall be constituted in every metropolitan, area a Metropolitan Planning Committee to prepare a draft development plan for the Metropolitan area as a whole. The constitution of these committees would be governed by the legislative of a state.

Regulatory

The 74th Constitutional amendment focused on changing the regulatory structure of the urban local government by giving them more financial powers and increasing their functional domain as mentioned in the relevant sections below.

Powers authority and responsibilities of Municipalities

Subject to the provisions of this Constitution, the Legislature of a State may, by law, endow--

(a) The Municipalities with such powers and authority as may be necessary to enable them to function as institutions of self-government and such law may contain provisions for the devolution of powers and responsibilities upon Municipalities, subject to such conditions as may be specified therein, with respect to-

(i) The preparation of plans for economic development and social justice;

(ii) The performance of functions and the implementation of schemes as may be entrusted to them listed in the Twelfth Schedule;

Twelfth Schedule

1. The functions of the local government will undertake functions as described under the 12th Schedule which includes the following:
2. Urban planning including town planning.
3. Regulation of land use and construction of buildings.

4. Planning for socio-economic development.
5. Roads and bridges.
6. Water supply for domestic industrial and commercial purposes.
7. Public health, sanitation conservancy and solid waste management.
8. Fire services.
9. Urban forestry, protection of the environment and promotion of ecological aspects.
10. Safeguarding the interests of the weaker sections of the society (including the physically and mentally handicapped).
11. Slum improvement.
12. Urban poverty alleviation.
13. Provision of urban amenities and facilities such as parks, gardens, and playgrounds.
14. Promotion of cultural, educational and aesthetic aspects.
15. Burials and burial grounds.
16. Cattle pounds; prevention of cruelty to animals.
17. Vital statistics including registration to animals.
18. Vital statistics including registration of deaths and births.
19. Public amenities including street lighting, parking lots, bus stops and public conveniences.
20. Regulation of slaughterhouses and tanneries.

Financial structure

Audit of accounts of Municipalities.

The Legislature of a State may, by law, make provisions with respect to the maintenance of accounts by the Municipalities and the auditing of such accounts.

Power to impose taxes by, and funds of, the Municipalities.

The Legislature of a State may, by law,--
(a) Authorise a Municipality to levy, collect and appropriate such taxes, duties, tolls and fees in accordance with such procedure and subject to such limits;

(b) Assign to a Municipality such taxes, duties, tolls and fees levied and collected by the State-Government for such purposes and subject to such conditions and limits;

(c) Provide for making, such grants-in-aid to the Municipalities from the Consolidated Fund of the State; and

State Finance Commission

(1) The Finance Commission constituted under article 243-I shall also review the financial position of the Municipalities and make recommendations to the Governor as to-

(i) The distribution between the State and the Municipalities of the net proceeds of the taxes, duties, tolls and fees leviable by the State, which may be divided between them under this Part and the allocation between the Municipalities at all levels of their respective shares of such proceeds;

(ii) The determination of the taxes, duties, tolls and fees which may be assigned to, or appropriated by, the Municipalities;

(iii) The grants-in-aid to the Municipalities from the consolidated funds of the State;

(iv) The measures needed to improve the financial position of the Municipalities;

Present status of implementation of 74th Amendment

The status on the implementation of the 74th Amendment is different across various states as the responsibility of implementing this constitutional amendment is a state subject. The table 2 gives the present status of implementation of the 74th Amendment in Uttar Pradesh.

Table 2: Present Status of implementation of 74th Amendment in Uttar Pradesh as on 1996

Provisions	Status of implementation
Constitution of State finance commission	Yes,
Formation of State election commission	Yes
Municipal elections conducted	Yes
Constitution of district planning committee	Notification yet to be issued
Constitution of metropolitan	Under consideration

planning committee		
Powers, authorities and responsibilities of municipalities	--	Functions already assigned prior to constitutional amendment have been continued

Partial efforts have been made in implementation of the various provisions in the 74th Constitutional Amendment. Therefore in the present situation, the grass root level implementation of all the provisions of the 74th Constitutional Amendment has still not been completed. All the regulatory provisions in the 74th Amendment have been implemented in the MCD Act, 1957 including financial powers and obligatory functions on the municipal body. However the status of institutional changes and division of responsibilities between various institutions and within the municipal body remains an issue for examination

Issues for examination

It is the general feeling that the Constitutional amendment has ignored to a large extent the financial powers of the bodies, since they are still decided by the state government. There is no Constitutional guarantee provided to the municipalities to raise their own revenues, but there is also no "objection" in it, which disallows the municipalities to raise their own revenue. From the 12th Schedule although the functional areas are specified, the specific municipal functions under the 74th Amendment are not described.

Institutional structure

After the 74th Constitutional amendment, water supply, disposal of sewage and Solid waste management including protection of environment were defined as the functional areas of the local municipal government. Although devolution of funds and decentralised civic functions are the salient features of the 74th Amendment, still the state government has a control over the functioning of the municipal bodies. The state government are yet to address the fundamental issues such as functional clarity, closing vertical gap of functions and commensurate revenues, location and distribution of executive and policy-making authority, recasting state controls, enabling various partnerships, personnel policies, and capacity building.

Regulatory structure

The legal framework of the country is old, but comprehensive in terms of its coverage. Although there maybe several loopholes in the laws which is an issue in itself, the problem has always been more of implementation/enforcement. Also, it is not as if there are too few laws; in fact, there are a plithoria of laws, which look at the environment, urban planning, and the supply of basic services. These could be in the form of central enactments, state legislatures and/or the municipal acts such as (Municipal acts, water supply and sewerage acts and Water act, 1974)

The Constitution of India specifies the functions and authority of local governments in the 74th Amendment, which apart from giving constitutional recognition to the LGs which implies, among other things, that they should be an elected body as representatives of the people. Also with this Amendment, the functional areas of the municipalities have increased. The municipal bodies now have the legal powers to perform some of these functions and levy charges for delivering these urban services. It is popularly felt that still adequate financial and legal backing for them is lacking to undertake the set of assigned functions, let alone that for the new ones.

Municipal Finance

A strong financial structure is essential for a municipal body to perform its designated functions and responsibilities and carry out development projects. Powers to impose municipal taxes and levy fee and charges as mentioned earlier have been given to the municipal bodies. A little innovation has been done in the present tax structure and possible sources to raise revenues exist; and also the appropriate interpretation of the relevant laws could be effectively used as they exist or with a few possible amendments.

Conclusions

74th Constitutional Amendment is a very important milestone in introducing the decentralised local urban governance in India. The main objectives of this Act could be summarised as:

- To provide constitutional status to institutions of local self-government.
- To decentralise the decision-making powers of the political process to achieve participative democracy and decentralised planning process.
- To establish uniformity in governance of municipal bodies throughout the country.
- To improve the financial position of these bodies.
- To ensure adequate representation to the weaker sections of society.
- To improve community participation in the overall development process.

However, still a lot of work has to be done in order to make the 74th Constitutional Amendment meet its desired objectives.

- Speed up the process of implementing the provisions in the amendments in all urban local bodies in all the States.
- Till now the municipal bodies did not have powers to perform most of the functions, their powers and domain of operation were very limited. Therefore they lack the necessary capacity and capability to perform such functions.
- The State government should therefore not only initiate programs for capacity building of urban local bodies to perform these functions but also help them in resource mobilisation and ensure judicious allocation of financial resources through its state machinery.

Environment linkages

Provision of water supply, disposal of solid waste and protection of environment are now some of the functions listed in the twelfth schedule of the 74th CA. Inefficient compliance to these functions would result in degradation of environment quality of the municipal area. The Municipal bodies are governed by the municipal acts, which as such do not mention about the standards and other references for guiding the municipal bodies to maintain their environment al standards and deliver basic urban services. Therefore there is a need to link these municipal acts to the related environment acts so as to ensure a cleaner environment at the local municipal level.

Public participation in assessing urban services

Why involve citizens

There are several constraints associated with sustainable urban development. These include inadequate public investment, outmoded and inconsistent laws, multiplicity of government agencies, a weak regulatory framework, complicated procedures and low operational efficiency of executive agencies and limited public participation (Balachandran 1996, NIUA 1998, Sivaramakrishnan 1993a, World Bank 1998).

Experience shows that public participation is essential for planning as well as implementing development programmes. There are four arguments for this in the context of urban services. First, people know their local environment. Second, they are clients of municipal agencies. Third, they elect municipal councils. Fourth, they are stakeholders in improving services. Thus, public participation is useful in aligning services to local needs and situations. It is instrumental in choosing appropriate technology; suitably maintaining and managing local facilities; lowering the cost of operations; effective monitoring; improved cost-recovery; and in serving socially and economically disadvantaged sections. Further, public participation encourages local initiative to address local issues, and stimulates necessary policy change.

While the need for greater involvement of civil society in the delivery and management of urban services has been recognised, there are major institutional barriers to achieving this end. These include the absence of legal provisions for universal coverage of services; absence of processes of public consultation; poor public interface of government authorities; lack of transparency and accountability; limited incentives for citizen initiative; lack of information at the local level; and low public awareness. This results in a situation of public apathy, whereby residents do not demand that government agencies perform mandatory functions; do not share in the task of managing public services; do not initiate action in self and community interest; and do not review the way civic decisions are taken and municipal bodies are governed (Sivaramakrishnan 1993b).

The objective of USERS is to develop a rating system that assesses water supply and waste management services provided by municipal agencies and leads to improvement in the quality and delivery of these services. Involving all stakeholders, including citizens, in developing the system and in assessing services is an integral part of the programme. This survey of literature concentrates on involving local communities and citizens in relevant activities.

What is participation

Pretty et al (1995) list seven types of participation. 'Participation in information giving' is at the lower end of the list. This is an extractive process, as people do not have the opportunity to influence proceedings. The research findings are neither shared with them nor are they checked for accuracy. 'Participation by consultation' is an improvement over this whereby external professionals define both problems and solutions and may modify these in the light of people's responses. However, this process does not concede any share in decision making and professionals are under no obligation to take on board people's views. At the higher end of the list is 'interactive participation'. This involves joint analysis which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes.

Recent work on research ethics clearly designates extractive research as non-participatory. Norton (1998) observes that the transition from extractive to participative research is a difficult one. He notes that in participative research, analysis takes place at different levels and by different actors (e.g. the community and the research team). The process of analysis should be as transparent as possible and every attempt should be made to make clear the analytical contribution that has come from each group. Further, he cautions against making exaggerated claims about the outcomes in terms of participation or empowerment.

Various researchers have discussed the problem of unfairly raising expectations of communities in extractive research. According to Shah (1997) participatory methods should ideally be used in contexts where there is a possibility for follow up, whether by the community or by a local government or non-government support agency. If such possibilities do not exist, it is better to use conventional rapid appraisal techniques. However, he argues that it is possible for researchers to consciously develop a methodology that produces multiple products leading to an action and research continuum. Dogbe (1996) suggests that the research team may approach a community through an organisation already working with it, and make a financial contribution to the development fund of the community in appreciation of the time it spends on the study. Kane et al (1996) observe that it is useful for an interactive exercise to lead to framing an action plan by the community for itself.

Participatory research

Participatory learning methods (PALM) have enormous opportunities for collaborative, rigorous, multi-disciplinary, quantitative and qualitative research. PALM refers to an entire range of principles and practices for interactive participation to understand and address situational realities. Through considerable methodological research and drawing from parallel streams of inquiry, participatory rural appraisal (PRA) has emerged as a powerful process for sharing information, joint analysis and joint action. PRA methods have been extensively used by development professionals to plan and implement projects in a way that gives participants control over decisions, creates a stake in sustaining action, and stimulates individual and collective initiative (Chambers 1997, Pretty et al 1995).

Among a range of methodologies for participatory research, PRA is one of the few that provides a broad philosophy in addition to distinctive tools for investigation that encompass capacity building, empowerment and action in the community. Its techniques have been applied in various locations and contexts; in projects relating to natural resources management, agriculture, and irrigation; and in the study of poverty, gender, livelihood and health issues. In recent years, such methodologies have been widely used in urban areas in Asia, particularly among low-income groups

However, there is relatively less experience in participatory research that does not necessarily culminate in projects or programmes that directly benefit the community. The latter differs from conventional PRA systems, as the primary objective is to influence policies, and not to initiate projects or programs. Participatory policy research (PPR) is therefore taking shape as a distinct stream of PALM that borrows many of the principles, techniques and tools of PRA, among other methods, and orients them towards influencing policies. Blackburn (1996) notes that a focussed participatory study can generate the kind of information that is indispensable to make specific sectoral policies more sensitive to the realities of local people, even though a clear connection between such a study and a subsequent policy change cannot often be proved.

Research practices

A summary of the relevant participatory research practices is presented below:

- A number of studies successfully combine participatory methods with other study methods such as conventional surveys (Robb 1999, Kane et al 1996, Cottam 1994)

- In order that the results of participatory studies are representative, a combination of cluster sampling and non-random purposive sampling may be used (Kane et al 1996). Ravnborg et al (1997) sampled communities based on indices (using secondary data, GIS) using a maximum variation sampling strategy.

- Research design must be flexible in order to preserve its participatory character. A flexible framework seeks multiple perspectives rather than starting with a defined set of issues. People should list perceived problems and their features and identify parameters and indicators. This process encourages new perceptions to come to light and generates lists that can then be categorised. Causal relationships may be explored and separated from descriptive findings. Analysis should be discussed with the community. People should present solutions for subsequent categorisation. External inputs are needed to synthesise policy inputs (Moser and Holland 1996).

- The research design must identify the anticipated desired results; to whom they are to be presented to and how; whom they are targeted to influence and with what kinds of outcomes. The capacities for action would differ between CBOs, NGOs, local service providers, line ministry managers, local government, donors, and national government. It is necessary to allocate sufficient time to develop the research design. Training, preparing a basic field guide, and maintaining quality of recording and reporting of field exercises are critical (Norton 1998).

- Triangulation is a key tool to validate findings using multiple sources, methods and investigations and should be used at all stages of the study. It is particularly important to counter official views. However, its usefulness goes much beyond cross checking information. It can reconcile diverse views of different constituencies in the final analysis and include the different perceptions of distinct interest groups both within and outside the community (Amis 1994, Moser and Holland 1996, Norton 1998).

- Analysis of results is time consuming. There is a need to identify suitable methods of analysis and presentation geared towards influencing policy. Use of informant testimony is often a powerful tool. Reports must present field results to communicate methodological rigour and professional process, to those not familiar with the techniques used (Norton 1998).

Urban participatory studies

The use of participatory tools in urban areas is largely associated with project planning and implementation, rather than research alone. Thus, the choice of research methods in USERS would involve a careful assessment of the suitability of a range of methods, depending on the expected outcome of the study. Key aspects of some of the relevant studies are presented below.

USA: citizen engagement in performance measurement

In city and county management in the USA there is a trend of increasing emphasis on community participation in policy making and problem solving. In a study of over 30 communities it was found that citizens and government could be effective in improving their community by working together to identify important goals and to measure and manage performance. Two of the best known citizen-driven groups to initiate performance measurement are Sustainable Seattle and the Jacksonville Community Council Incorporated. In these groups citizens set the strategic agenda, identify indicators, analyse data, refine and update it and sustain a dialogue to catalyse action. Some important questions that need to be considered are, whether all of the measures are determined only by government or do citizens identify critical issues, how they should be measured and how to define success (Marshal et al)

The eighth annual report on city government performance of the Portland city includes an assessment of citizen satisfaction among other other performance measures. For this purpose, an annual survey is conducted that elicits opinions on city services (such as fire, police, water, stre lighting, etc.) as well as city or neighborhood values (such as safety, housing conditions, street cleanliness, etc.). The response are aggregated and compared to those expressed 5 years earlier. In addition, specific questions are asked in relation to each service (Portland city auditor 1998).

Report cards on public services

The Public Affairs Centre, Bangalore, has designed this method to assess urban services, particularly in low-income communities. It is based on the rationale that in the absence of competitive pressure on agencies to perform, the only option to constructively engage service providers is to provide them with public feedback, in the form of a report card. If widely disseminated, this would enable all stakeholders to find ways to provide resources and redesign systems to improve performance. Although based on subjective personal experience, the results of the method become significant when aggregated. They are also designed to stimulate follow-up action by NGOs and local grass root agencies, and may result in positive steps by government agencies as well. Key features of the method are presented below:

- The approach generates citizens' appraisal of quality of services; compares the quality across groups and locations; measures agency responsiveness; and provides an avenue to highlight difficulties encountered with service providers.
- The method involves focus group discussions in selected localities. This refers to small groups of people who are encouraged to discuss their common problems in the presence of a facilitator. This is particularly useful to generate qualitative information and conclusions backed by consensus. The second source of data is a random sample survey of residents in the locality. Trained investigators interview the main income earner from the selected household using a structured but simple questionnaire (Paul 1995).

Participatory urban appraisal

Francis (1994) reports the successful use of the following techniques in urban slums in five Indian cities:

- *Resource mapping*: used to depict relationships between households of different socio-economic groups, facilitate community identification of problems and solutions and illustrate access to and control of resources within the community. Can lead to discussions on the lack of services, drainage, overcrowding, cramped living conditions, disposal of solid and liquid waste and lack of safe and adequate drinking water. An extremely useful tool for identifying and discussing issues that specifically affect women. However, Cottam (1994) encountered poor participation in a mapping exercise in a study on women's health in the Dominican Republic.

- *Seasonal calendars and activity schedules*: can help to identify seasonal events and constraints such as drinking water availability and drainage blocks. Also to work out possible engineering, health and community development solutions.

- *Focus group discussion*: small group (by occupation, gender, age, language) with facilitator can explore issues in depth such as space requirements, water supply, and rubbish disposal. In a study of health and habitat issues in Buenos Aires, Argentina, Arrossi (1994) found that it was important to sufficiently inform participants of the purpose and issues to be discussed and to select a convenient time and place. Cottam (1994) found this tool useful to discuss health issues with women in a study in the Dominican Republic.

- *Trend analyses*: used to highlight changes in a community over 20-40 years such as in education, drinking water, drainage, infrastructure and housing. Leads to learning about pressure for space and resources.

- *Venn diagrams*: used to learn about the relationship between community and government departments, raise awareness among different informants about their access to resources and the presence of social restrictions, and to illustrate differing perceptions of different informants. Useful to understand how access to resources and preferences for services differ between informants.

- *Matrices*: help to evaluate various development programmes in terms of their success in addressing the practical and strategic needs of men and women

Leach (1994) reports the effective use of transect walks, pie charts, semi-structured interviews, informal interviews and case studies to assess a government voucher system for food and kerosene with local traders in Adis Ababa. Shah (1995) describes participatory research and training workshops with slum dwellers in Ahmedabad. This is a system of collective learning and action to update qualitative and quantitative information. Residents play a key role in framing a checklist for information collection as well as collecting information. A similar approach is discussed by Boonyabanchya (1995) in the formulation of a national urban land policy for low income housing in the Philippines.

Rapid urban environmental assessment

This approach was developed by the environment component of the urban management programme, a joint undertaking of the UNDP, the UNCHS and the World Bank. It has three components: compilation of baseline data, preparation of an urban environmental profile, and stakeholder consultations. The consultations are to be held with three sets of actors: whose interests are affected by environmental degradation, those who control relevant instruments for environmental management and those who possess relevant information and expertise. These include NGOs, community leaders, public advocacy groups, academics, research institutes, private consultants, government agencies and private and informal sector enterprises. The methodology does not envisage direct consultation with residents. Its key features are:

- A series of discussions (separately and also in a public forum) to identify problems, solutions, constraints, and opportunities
- Culmination in a town meeting/ forum presided over by the local executive
- Attempt to reach consensus on priority issues and to build political momentum for follow up
- Address a common minimum set of issues
- Attempt to rank problems
- Combine results with those of other components (Leitman 1993)

Status and description of cities

Cities are the symbol of culture, tradition, ethics, and economic strength of a civilization. City and civilization are thus synonymous to each other. In physical terms, a city is a centre of large concentration of population with distinctive life style, livelihood, organisation, landuse and institutions. City reflects the achievements of humanity.

DELHI

Delhi is one of the most discussed and documented cities in India. It has, all through its history, been the city of charm and destiny. It is also said to be an eternal city, at times rising to unmatched glory, at others raised to the ground to sprout and grow again. Successive emperors and kings who ruled India from Delhi have left their imprints on its internal physical structure, space relations, social configurations, values and ethos. It is now the seat of the largest democracy of the World destined to be a formidable economic and political power in not too distant a future. This capital city of India, situated on the banks of the river Yamuna, is a city of great cultural heritage, which has evolved a distinct character of its own over the centuries.

Features of the city

Delhi is located 160 km. south of the Himalaya at a latitude of 28° 24' 17" to 28° 53' 00" and a longitude of 76° 20/37" to 77° 20' 37" with an altitude of 216 meters above mean sea level. To the West of Delhi is the Great Indian Desert (Thar Desert) of Rajasthan, to the South, the Central hot plains and the cooler hilly region to the North and East. There are two distinct natural features that characterise Delhi: The Ridge and the river Yamuna. The latter forms the Eastern boundary of the city. The Ridge is an extension of the Aravalli Hills, the oldest hill range of India which runs from the south of Delhi towards the North-East on the West of river Yamuna and further South West into the State of Rajasthan. Due to abundant trees and plant life, the ridge is often rightly called the 'lung of Delhi'. Physical dimensions of the city extend to about 51.9 km length-wise and 48.48 km. width wise. Its entire area of 1483 square kilometers is spanned by historical monuments like the Qutub Minar, which dates back to the Slave Dynasty and the Red Fort and the Humayun Tomb representing the Mughal period. The physiography of the NCT of Delhi comprises of almost flat plain land with a cluster of sand dunes in the south-western part and the long rocky ridge. The general slope is from west to east. In the Trans-Yamuna area while the slope is from north to south, it is from east to west in the southern part of the territory.

Glimpses from history

Between the 12th and 19th centuries that is, in Muslim India, the capital city was Shahajahanabad, better known as Old Delhi now. In 1931, New Delhi, located immediately to the south of Old Delhi was designed by Edward Lutyen and Herbert Baker, which has been, since then, continuing to be the capital city of India.

The early history of Delhi, is an interesting mixture of myth and reality. The strategic location of Delhi, between the Aravalli hills and the river Yamuna, had attracted the attention of almost every king of conqueror in this part of the world. The earliest reference to Delhi as a settlement is made in the Hindu epic, Mahabharata, which states that the Pandavas founded a city called Indraprastha, beside the river Yamuna in 1450 B.C.. Every since then, conquerors from the north treated Delhi as gateway to the Indian sub-continent. With repeated invasions and successions of empires and kingdoms, Delhi was established and demolished time and again. Each dynasty built a new city, which reflected on the times and lifestyles of the ruler. Thus, in the course of history, seven medieval cities were formed.

Historical and political development of Delhi: Seven-Seventeen Delhis

Order		Date	Name of the Settlement	Founders	Present Probable Site
I	1	900 B.C.	Indraprastha	Yodhishtra	Purana Quilla
	2	1020 B.D.	Suraj Kund	Anang Pal	Near the road linking Mathura Road and Mehrauli Road by the same name.
	3	1052	Lal Kot	Prithviraj Chauhan	Near Qutab Site
	4	1180	Quilla Rai Pithora	Prithviraj Chauhan	
	5	1288	Kilokheri	Muiz-ud-din Kaiquabad	
II	6	1301	Siri	Alauddin Khilji (1295-1315)	Near Hauz Khas
III	7	1321-1323	Tughlaqabad	Rayasudin Tuglaq (1321-1325)	On the link road connecting Mathura Road and Mehrauli Road Near Qutab Minar
	8	1325	Adilabad	Mohammed Tughlaq (1325-1351)	Near Tughlaquabad
IV	9	1327	Jahanpanah (World's Refuge)	Mohammed Tughlaq	Between Siri and Raipithora
V	10	1354	Ferozabad	Feroz Shah Tughaq (1351-1388)	Near Ferozshah Kotla Stadium
	11	1415	Khirabad	Khirakhan	(no trace)
	12	1415	Mubarakabad	Mubarak Shah	(no trace)
VI	13	1530 (1533?)	Dinpanah and Sher Garh	Humayun (1530, 1538; 1555 - 1556) Left incomplete; completed by Sher Shah Suri (1538-1545)	Purana Quila
VII	1	1638	Shahjahan	Shahjahan	Old Delhi

4		(1638-1649)	(1628-1658)	(Walled City)
15	1912 (1911)	Delhi	British Capital	North of Walled City Shajhanabad; Old (Civil Lines) Secretariat etc.
16	1931 (opened)	New Delhi	British Capital (Designed by Lutyens and Baker)	Central Vista, Connaught Place and near about area
17	Aug. 15, 1947 - date	New Delhi	Capital of free India (subsequently designed by T.P.O., T.C.P.O. & D.D.A.)	Delhi Urban Area

Chronology of planning activities in Delhi

After independence, the Delhi Improvement Trust, (DIT) which had started functioning way back in 1937, continued functioning till mid fifties. However, the limited role being played by the Trust and its failure to deliver a comprehensively planned urban environment, resulted in the DIT Inquiry Committee (Birla Committee) recommending the creation of a Central Authority for making plans, schemes and to administer them with adequate powers. Following the recommendations of the Committee, on the one hand Delhi Development (Provisional) Authority was created and on the other hand, Town Planning Organisation (TPO) was established by the Ministry of Health, under the chairmanship of the then Chairman, DIT in 1955.

The TPO prepared the Interim General Plan for Delhi in 1956 culminating into the Master Plan of Delhi with the perspective year 1981, published in 1962 by the DDA. As an integral component of this Master Plan, the Existing Land use of Urban Delhi (based on Land use Inventory TPO, 1958), was published, which recorded an urbanized area of 42700 acres (17287.45 ha.) in 1958-59, constituting 11.7% of the total area of Delhi Union Territory, holding approximately 20 lacs urban population.

The recently acquired IRS-1C data for the National Capital region on 21st March, 1999 by the National Capital Region Planning Board (NCRPB) from National Remote sensing Agency (NRSA), Hyderabad, indicates that the built up area in Delhi has increased roughly to 75000 ha (including the built up area of rural settlements) which is more than 50% of the area of NCT Delhi.

In order to establish various institutions and authorities for planning and development of Delhi, following are some of the important legislation's enacted :

- Delhi Development Act, 1957 under which the DDA was established as a Planning and Development Authority for the entire Union Territory, and the Authority was vested with the responsibility of preparing and enforcing the land use and development plan
- The Delhi Municipal Corporation Act, 1957 which applies to water supply and Electric utilities.
- The Punjab Municipal Act, 1911 under which the New Delhi Municipal Committee is governed.
- The Cantonment Board Act, 1824 under which the Delhi Cantonment area is regulated; and the land revenue code of the Union Territory which governs the area outside the municipal limits including the conversion of agricultural land for urban use and the fixation of boundaries of village habitations.
- The Delhi Slum Improvement and Clearance Act, 1957 which provides for the declaration of slums, provision of amenities and protection of the slum dwellers from arbitrary eviction by private owners.

Some of the key institutions involved in managing the civic services in Delhi are as follows :

Municipal Corporation of Delhi (MCD)

Formed under the DMC Act, 1957 is headed by a council comprising of a mayor and elected members. The executive powers are vested in the Municipal Commissioner.

The New Delhi Municipal Council (NDMC)

The NDMC has been formed by the NDMC Act, 1994. NDMC is smaller than MCD in terms of the area under its purview, looks after those parts of Delhi which caters to VIP areas.

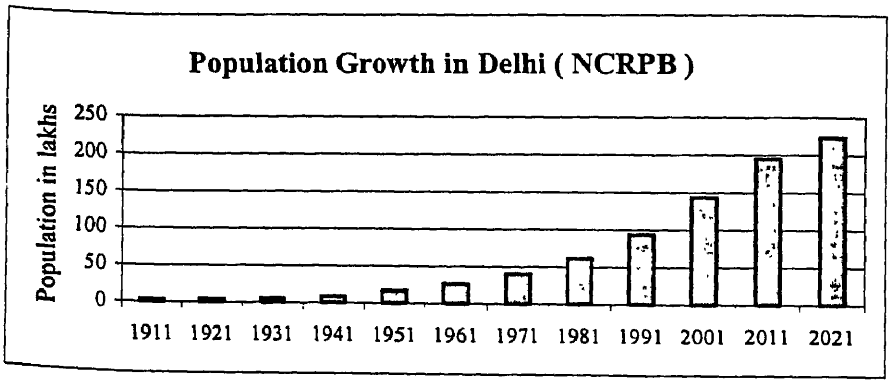
Delhi Cantonment Board (DCB)

The DCB is incharge of the area that is owned by the Ministry of Defence, and is governed by separate rules and laws.

Municipal functions relation to provision and maintenance of civic services are listed in Sections 42 and 43 of the DMC Act 1957. These sections provide for obligatory and discretionary functions. The obligatory functions include sanitation and cleanliness, public health, medical relief through establishment and maintenance of hospitals, dispensaries, health centers etc., maintenance of fire services, generation and supply of electricity, supply of wholesome water, slum clearance, disposal of the dead, registration of birth and death, construction and maintenance of public streets, bridges and culverts, primary education etc. The discretionary functions relate to furtherance of education in general, cultural activities, social welfare, housing, improvement schemes, organisation of fairs and exhibitions, relief to the destitudes, organisation and maintenance of water, food and drugs etc. The discretionary functions are to be performed only if the MCD is in a position to finance such functions.

Demographic Profile of the city

The population of NCT-Delhi has been growing at an alarming rate. Delhi started as a small town with a population of hardly 4.1 lakhs in 1911 and grew steadily to reach a population of 9.2 lakhs in 1941 to 17.4 lakhs in 1951; registering a decadal growth approx. 90% mainly due to unprecedented influx of refugees from Pakistan during 1947-48. Then onwards in the next 4 decades the decadal growth rate has constantly been above 50% and had resulted into a population of 94.21 lakhs in 1991. Despite serious efforts to diffuse the population to other parts of India, Delhi's growth has continued unabated.


Population Growth in Delhi (NCRPB)

Recent projections have indicated that the population of NCT-Delhi is estimated as 134.2 lakhs in 1999 and if continued unchecked, is likely to reach 143.7 lakhs in 2001, 195.1 lakhs by 2011 and cross the 2 Crore mark by the end of 2012 and 224.2 lakhs by 2021 A.D. The population is growing fast mainly because of migration; between 1981-91 almost 50% of the population growth was contributed by migrants. The migration has taken place mainly from NCR states of Uttar Pradesh (49.91%), Haryana (11.82%) and Rajasthan (6.17%), and far off backward states like Bihar (10.99%).

Rising environmental impacts and concerns

The pressures due to high rate of urbanisation, population growth and growth of migrants in search of better opportunities have laid tremendous stress on the living systems of the city. It has resulted in deterioration of the basic urban services and has given rise to several environmental concerns of which the critical ones are as follows :

- Stress on drinking water supply systems
- Waste water collection & treatment capacities
- Discharge from storm water drains in Yamuna
- Management of MSW and Hazardous waste
- Rise in number of vehicles - high air poll.
- Increasing gap in demand / supply of power
- Closure and shifting of industries
- Growth of unorganised settlements

Below is being discussed an overview of the status of three basic services – fresh water resources and water supply system, waste water and the sewage system, and the situation of solid waste management in Delhi along with a brief on the state of pollution levels in river Yamuna. The data however reported is a culmination from various sources and in many cases there has been a difference in facts reported by different agencies. Each component has attached with it the highlights of the material published recently in the media in order to understand the situation from all different perspectives.

Water Supply

Delhi depends on surface water sources for 90 percent of its water needs. River Yamuna is the main source supplying as much as 42 percent. The Western Yamuna Canal and the Ganga Canal supply 24 percent each. Groundwater sources (rainey wells and tube wells) contribute the remaining 10 percent. With the rapid growth of population in Delhi, there has been a concomitant rise in water demand resulting in acute shortages of water. The per capita demand for water supply in Delhi has been increasing steadily. Every year various parts of Delhi face water scarcity.

Delhi is dependent for raw water from distant sources and augmentation of raw water for Delhi has been a permanently unsolved issue i.e. escalating population cannot be matched by proportionate increase in the raw water availability. The water supply to citizens of Delhi is through water treatment plants i.e. Chandrawal (90 mgd), Wazirabad (120 mgd), Haiderpur (200 mgd), Shahdara (100 mgd) and rest through Ranney Wells/Tubewells.

According to Delhi Jal Board, the current treatment capacity in the year 1999, is 2645 mld.. against which the demand for water is 4765 mld, based on MPD-2001 norm of 363 liters per capita per day for urban population and 100 lpcd. for rural population. Thus against the present water demand, the shortage is approx. 45%. This shortage/gap is likely to increase to 47% by 2001 AD which will increase to 57% in 2021 AD inspite of including the additional water supply from Tehri dam which is under construction and likely to be commissioned by 2002.

The Water Supply in Delhi is far from uniformly distributed. The NDMC area/Delhi Cantonment area gets average supply above 450 liters per capita per day while Narela/Najafgarh zone gets less than 80 liters per capita on an average with some parts getting less than 35 liters per capita per day water supply. Except the NDMC area the rest of the city has water problems i.e. low water pressure, erratic municipal water supply. Besides the quantify, quality of potable water is another serious concerns as it directly affects the health of citizens. Instances have been noticed in the past where, in many places, the sewage water got mixed up with water supply thus contaminating it. The quality of ground water is also variable in space and depth.

Highlights from the 'media'

- *Water drawing charges also being revised in unauthorised/ unregularised colonies - Delhi Jal Board*
- *Cost of water treatment also to be transferred on to the users for sustainability of services*
- *Efforts from Delhi Jal Board and Central Ground Water Board for awareness to Resident Welfare Associations for "Rain Water*

Waste Water

Delhi generates large quantities of sewage, at present, the total quantity of sewage generated is 2,871 mld whereas the total capacity of the sewage treatment plants in Delhi is 1,478 mld while the remaining 48% untreated sewage (1,393 mld) finds its way into river Yamuna through the 19 major drains outfalling into the river carrying sewage and industrial effluents from the city.

As a result the water quality in the river has been deteriorating and the water in the river is at present unfit even for animal drinking and agriculture use.

The sewerage facilities at present in the city are covering only about 75% of the population. The sewage system is non-existent in large parts of trans-Yamuna area, all resettlement colonies and, of course squatter settlements. The 113 urban villages possess internal sewage system. In other parts of the city sewage lines, laid decades ago are now unable to carry the increasing quantities of sewage and are in a state of virtual collapse. The trunk and branch sewers have settled at many locations and have not been repaired for a long time. This appears to be one of the major reason for the over flow of sewage into the storm water drains and into the river Yamuna.

Of the total sewage generated in Delhi, it is estimated that 218 mld (48 mgd) consists of industrial effluents. Delhi State Industrial Development Corporation Ltd. (DSIDC) has proposed construction of 15 common Effluent Treatment Plants CETP's in Delhi as per directions of the Hon'ble Supreme Court of India. The treated effluent will be discharged in the same drains in which it is flowing at present.

On the basis of MPD-2001 water supply norms, the quantities of sewage estimated to be generated in 2001 will be 4,115 mld which will increase to 6,491 mld. In 2021 AD while Delhi Jal Board by augmenting the existing capacity of sewage treatment plants and construction of new STP's will have a total treatment capacity of 2,290 mld, there will still be a wide gap, which may be about 59% in 2011 and is likely to increase to 65% by 2021 AD.

Highlights from the 'media'

- *Maintenance of sewers from MCD transferred to Delhi Government*
- *Delhi Jal Board responsible for collection, treatment & disposal of sewage*
- *DJB to construct & maintain sewers (they were being maintained by MCD)*
- *MCD plans for maximum accountability among staff, involved in sanitation*

Yamuna

Delhi poses the biggest challenge in the onerous task of cleaning the Yamuna. The largest polluter of the river, Delhi is also the largest consumer of water, with a production of 2,728 mld of treated water. Though the length and basin area of the river in Delhi is only 2 per cent of the total BOD load discharged into the river every day.

Parameters	Upper segment	Delhi segment	Eutrophicated segment
D O (mg/l)	7.95	1.41	8.33
BOD (mg/l)	3.7	17.2	8.8
Dissolved solids (mg/l)	270	563	793
Total Coliform (MPN/100ml)	13000	9000,000	180,000

MPN – most probable number

Highlights from the 'media'

- **SC Order (24 Jan, 2000) for CPCB to monitor Yamuna pollution** levels
- *SC order for Delhi Government to close polluting industries*
- *Delhi Government action against polluting industries results in*
  - *Decline in pollution levels in Yamuna*
  - *COD lowered from 45 to 26 at Agra Canal - CPCB study (Feb. 2000)*
  - *BOD : 90 to 48 in a month in Najafgarh drain (65% of city sewage)*
- *SC Order : April 28 - Deadline for Delhi Govt. to improve Yamuna water quality*
- *Sewage discharge from East Delhi, Ind., discharge from UP into Delhi drains*
- *Sufficient water flow required in Yamuna from UP & Haryana*

Solid waste

Delhi, with its urban and semi-urban population of 12.3 million (1997), is estimated to generate about 6000 tonnes of waste every day. These estimates are based on a daily per capita generation of about 500 grams. However the generation is not even and varies from 150 grams per capita per day to over 600 grams per capita per day depending on the economic status of the community involved. The total solid waste collection in Delhi however ranges from 5000 tonnes to 5500 tonnes everyday. The two main municipalities NDMC (New

Delhi Municipal Council) and MCD (Municipal Corporation of Delhi), are largely responsible for the collection, transport, and disposal of garbage.
All the collected solid waste in Delhi is disposed of in low-lying areas at the landfill sites following conventional ways of dumping. Since 1950's over 12 large landfill sites have been packed with all sorts of non-biodegradable and toxic wastes of Delhi. At present there are three landfill sites – Bhalaswa, Gazipur and Okhla. The base of none of these landfill sites are lined due to which continuous ground water contamination takes place. Neither the sites are prepared before using them for disposal-dumping of waste nor environment impact assessment has been carried out while selecting these sites. There has been very limited door to door collection system in the city however certain NGO's have taken initiatives in this direction. Plastics is an important constituent of rising environmental concerns, there are being efforts from the government and the community as well to tackle this problem.

Highlights from the 'media'

- *Campaign against plastic - Chief Minister's emphasis*
  - *Year long movement against plastic bags from April 2, 2000 by - NDMC*
  - *Supply of Jute or cloth bags – initiatives by Ministry of Textiles*
- *Fine for littering (Rs 50 fine – Supreme Court orders)*
  - *Challan under Sec. 351 of DMC Act (Creating insanitary conditions)*
- *Landfill Crunch*
- *Bhalsawa Landfill (LF) : life 2-3 months*
- *Okhla & Ghazipur LF : life 2-4 years*
- *Supreme Court directions to Delhi Govt. for making LF sites available free of cost*
- *MCD greening 19 used LF sites*
- *Non functioning of equipments on LF sites*

KANPUR

Kanpur, the industrial metropolis and commercial center of northern India, is the largest urban agglomeration, in the state of Uttar Pradesh, and ranks ninth largest urban center in the country. In its kaleidoscopic urban scenario manifested through smoke and coal ash belching chimneys of cotton textile mills and iron foundries, homeless squatters, squalid slums, overcrowding, traffic congestion etc. on the one hand, and sprawling new modern suburbs, multi-storied flats, universities and technical institutions, magnificent Radha Krishan temple and spacious zoo, Ganesh Udyan, Nanarao and Brijendra Swaroop parks, on the other. The metropolis epitomizes overwhelming contradictions and incongruities of physical structure, functional morphology and human situation.

The city previously known as – Kanhaiapur or Cownpore is located on right bank of holy river Ganga and has developed linearly along this river. The expansion of the city was restricted in Southern direction by the river Pandu. The city acquired important status when British Army Camp was established in 1778 and subsequent development as industrial town by East India Company which gained leverage of connecting railway line in 1859 and G T Road.

Nestling along the high natural levee of river Ganga, Kanpur enjoys a nodal location in heart of the northern plains of India, Lucknow, the capital of the state lies at a distance of only 72 km., New Delhi 425 km., Calcutta 1004 km., and Mumbai 1342 km. Centrally placed in the densely populated and agriculturally prosperous zone of fertile alluvial plain, it exists as a dominant node of transport network.

The city plays multiple function such as; Industrial growth centre with important industrial establishments of Urea Fertilizer Plant, Thermal Power Plant, LML scooters, Indian Oil Corporation and National Textile Corporation Mills, trade and commerce centre as major distribution centre for finished leather products, textile, fertilizer and for the products not manufactured in the city; as transit point; educational centre with educational institutes of national reputation (IIT, GSVM colleges), National Sugar Institute, CLRI, National Textile Institute, ICAR, Kanpur University etc.

Demographic profile of the city

The district is subdivided into rural and urban areas. The rural areas of Kanpur district comprises of three developmental blocks, viz. Kanpur (with some urban area),Bignu and Sarsaul. The urban area is divided into Nagar Mahapalika (renamed as Municipal Corporation in 1994), Bithoor town area and Kanpur cantonment. The break-up of urban area in Kanpur Nagar district and population as per 1991 census are given in Table below

Area and population distribution as per 1991 census

Urban segment	Area (sq. km.)	Population (millions)	Population density
Municipal Corporation*	279.41	0.007	6925

Town Area Bithoor	8.68	858	858
Cantonment	17.18	5531	5531
Total	305.27	2.037	6674

*including Kalyanpur Block

The urban agglomeration of Kanpur covers the area under Kanpur Municipal Corporation, Cantonment, Armapur Industrial Estate, Railway Colony, Chakeri, IIT etc. The Kanpur Development Authority (KDA) area extends beyond the urban agglomeration limits and extends upto 8 km beyond municipal corporation boundaries excepting in north. The total area under KDA is 829 sq. km. of the total Kanpur Nagar district area of 1040 sq. km.

Demographic profile of Kanpur

Pollution of Kanpur has increased from 2.44 lakhs in 1931 to an astonishing figure of 22 lakhs by 1991. The population has multiplied by 10 times with in a span of 60 years. The city has experienced a rapid growth in population between 1931 to 1951 due to large influx of industrial laborers and refugees. The decadal variation of population growth from 1901 to 1991 are as shown in the table.

Population growth in Kanpur city

Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991
Population	202797	178567	216436	243755	487324	705333	971062	1275242	1639062	2194278

Source. Kanpur Development Authority

The growth of the city increased form 28.5% during 1971-81 to 33.8% during 1981-91. At present the urban area has a population density of 30000 persons per sq. km. Municipal corporation areas are more populated with average density 36000 persons sq.km.

Features of the city

In the master plan, the city is divided into four service districts, namely the city service district, the west service district, the south service district and the east service district.

Comparison of Kanpur with other KAVAL towns of Uttar Pradesh, namely, Agra, Varanasi, Allahabad and Lucknow reveals that Lucknow was the largest city in terms of population upto 1931. It was only after 1931 that Kanpur acquired the first position among the towns of the State. There are 296 identified slums with 5 lakhs population which includes colonies of industrial workers, common slums, population squatting on public land. The workers colonies, 90 in number, commonly known as Ahatas are in state of dilapidation due to lack of any development work from the industries which either already closed or under closure. The slums, commonly known as Abadis are with lack of civic services resulting in unhygienic living conditions.

Key institutions in Kanpur

The agencies having direct responsibility in one or the other form in regard to urban development activities in Kanpur Metropolis are:

- Town and Country Planning Department
- Kanpur Development Authority
- Housing Development Board
- UP Jal Nigam
- Kanpur Jal Sansthan
- Kanpur Nagar Mahapalika (Kanpur Municipal Corporation)
- Directorate of Local Bodies

Town and country planning department

This is an advisory department to the state government on matters pertaining to urban planning. It works in close liaison with and under the direction of the Secretary, Housing Development. The job involved in this department is to prepare Development Plans and Master Plans for metropolitan and other cities under the provision of the UP Regulation of Building Operations Act, 1958 and the UP Urban Planning Development Act, 1973. The enforcement of Master Plans in through controlling authorities, development authorities and the UP Housing and Development Board. The advisory role of the Town and Country Planning Department extends to enforcement agencies through its representation on their governing bodies.

Kanpur Development Authority (KDA)

Under the UP Urban Planning and Development Act, 1973, the Development Authorities have been set up by the Government in selected cities of the State by declaring such cities as 'development area'. Kanpur is one of these cities. The primary reason for taking out the development functions from the local self government institutions was that the technical competence was lacking with them. Another reason was that the political nature of the local self government would not be conducive to the development of professionalism required for the purpose. The objectives of the Development Authority are to promote and secure the development of the 'development area' according to its Master Plan. In order to achieve its objectives, the Authority has been vested with power to:

- acquire, hold, manage and dispose off land and other property; to carry out building, engineering, mining and other operations;
- execute the works in connection with supply of electricity; disposed of sewage, provision of roads etc.; and
- maintain other services and amenities to the extent required for development purpose

UP Housing and Development Board

Subsequent to amendment of the UP Housing and Development Board Act, 1966 in the year 1973, the Board was allowed to continue the then ongoing and proposed special housing and development schemes in the 'Development Areas' of newly constituted Development Authorities. In Kanpur, the activity of the Housing Board is only limited.

UP Jal Nigam

A technical organization at the state level known as 'Public Health Engineering Department' was created to act as an executing agency for carrying out water supply and sanitation works in the urban centers. In June, 1975, the State Government created an autonomous corporation called as "Uttar Pradesh Jal Nigam" under UP Water Supply and Sewerage Act, 1975, and merged the Local Engineering Department into the newly created Jal Nigam.

Kanpur Jal Sansthan

Under the UP Municipalities Act, 1916, supplying water to the community in the urban centers has been the responsibility of the local authority. Kanpur Jal Sansthan was established as an independent organization under section 19 of UP Water Supply and Sewerage Act, 1975, since then, water supply and sewerage system was taken away from the Municipal Corporation.

Kanpur Municipal Corporation (Kanpur Nagar Mahapalika)

The city government was upgraded from Municipal Board to Municipal Corporation in the year 1960. The specified duties are assigned to city government such as sanitation, street lighting, roads, streets, lanes, drainage, etc. Housing and urban development are no more its responsibility. Yet, provision of civic amenities in the new areas developed by the Kanpur Development Authority becomes the responsibility of Municipal Corporation.

Directorate of Local Bodies

For operating the scheme of centralization of municipal services in the State which commenced in 1966, and for streamlining the flow of financial assistance to urban local bodies as well as for enabling the state government over them, a Directorate, to exercise control of the local bodies came into existence. It acts as a head quarter agency and works as an intermediary between the secretariat and the local authority.

In addition to the above, few other agencies are involved in the development programmes and projects directly or indirectly. The division of responsibilities amongst the agencies is not so clearly defined. Primarily due to this reason a large number of issues have cropped up relating to multiplicity of authorities and overlap in areas of interest. Considerable resources are wasted and sometimes implementation of projects get delayed, particularly since many of them often work without proper coordination to resolve overlap of each other's functions and responsibilities.

Like the municipality of authorities, many legislative measures have come up as instruments for providing statutory backing to various agencies involved in urban development.

- UP Regulation of Building Operations Act, 1958
- UP Urban Planning and Development Act, 1973
- UP Housing and Development Board Act, 1965
- UP Industrial Area Development Act, 1976
- UP Slum Areas (Improvement and Clearance) Act, 1962
- UP Special Area Development Authorities Act, 1986
- UP Road Side Land Controls Act, 1945

Rising environmental concerns

Kanpur is one of the worst cities of India as far as the environmental conditions are concerned. Water, air, and noise pollution far exceed the permissible levels and the general health of the city dwellers is always endangered. Some of the most critical environmental problems are listed below :

- Main water resource contamination – Ganga river
- Water supply quality at end user
- Direct untreated discharge of waste water from domestic and industrial sources through open drains
- Poor management of MSW
- High air pollution due to poor traffic management
- Heavy noise pollution in the residential areas

Of the above mentioned problems in this chapter we shall be concentrating mainly on the issue of pollution of river Ganga, status of water supply system, waste water management and the management of solid waste in Kanpur city.

River Ganga and its pollution status

The river Ganga is the lifeline of millions in India. It traverses length of 2525 km. From its origin in Himalayas to the Bay of Bengal and passes through the three basin states. Uttar Pradesh, Bihar and West Bengal. All along for centuries past, the river had the cleanest of water. But in the recent past, in the process of development and the emergence of more and more settlements and sprawling cities along its bank leading to discharge of liquid and solid waste directly into the river without no prior treatment has made the river water polluted below even the standards set for bathing.

Under the Ganga Action plan about 20 polluted stretches of river Ganga have been selected and in this the stretch along the Kanpur city is observed as most polluted stretch. The Ghats of Kanpur which previously were famous for holy dips and prayers are now deserted as public has stopped bathing in the river due to excessive pollution.

Water supply system

The city exploits both surface and ground water sources of supply and obtains its surface supply from the river Ganga and Lower Ganga Canal. The water from the river and lower Ganga Canal constitutes 60% of the total supply and the balance supply is met through ground water sources. The tapping of ground water is most common in industrial areas. At some places ground water is getting polluted due to leaching of disposal effluents from industrial areas. The ground water has high content of chromium.

Kanpur Jal Sansthan has the pride of having the biggest water supply system of Uttar Pradesh. The water works was established in the year 1892 with a designed capacity of 35 ML per day to serve a population of about 2 lakh.

Currently the city has installed capacity of water supply of 300 mld (for 17 lakhs population) with average daily rate of supply of 176 lpcd. The water after treatment of Benajhabar water works is being distributed to 6 zones, from there after disinfection is being fed to local network through to 26 Zonal Pumping stations.

Waste water management

The discharge of waste water through various drains carrying both domestic and industrial effluent are the main cause of degradation of water quality in receiving water of river Ganga. The total quantity of waste water generation from the city (both domestic and industrial) coming from 26 drains city was found to be 392.04 mld with BOD and suspended solids load of 105 tonnes/day and 179 tonnes/day respectively in this the contribution of industrial effluent to total discharge is approximately 50.9 MID. Major portion of the industrial effluent is being discharged in to river Pandu. Presently 8 MID of the tannery effluent from Jajmau is being collected for treatment in UASB plant.
Out of 392.04 MID, 160 MLD wastewater is being discharged to rivers without treatment and only 232 mld is being treated. The city has total installed treatment capacity of 171 mld for domestic/industrial wastewater. The STP with UASB technology and bio-gas recovery with 65 to 80 percent efficiency has been commissioned in 1987 has the capacity to treat 5 mld and located at Jajmau under the Indo-Dutch project. The city also has Common Effluent Treatment Plant (CETP) commissioned in 1994 with its capacity of 36 mld (for 9 mld of tannery effluent in conjunction with 27 mld domestic sewage). The conventional sewage treatment plan commissioned in 1996-97 under Ganga Action Plan has the capacity of 130 mld.

Solid waste management

Kanpur generates 1500 tonnes/d of solid waste from domestic and commercial sources, apart from 250 to 350 tonnes/d of industrial waste. The responsibility of solid waste management is entrusted to Kanpur Nagar Mahapalika (Municipal Corporation).

For the purpose of solid waste management city was divided into six zones covering 50 wards. The collection of solid waste is being done in two phase. The frequency of collection depends on type of locality as in thickly populated commercial areas and posh areas i.e. civil lines the frequency is better while in other areas it is very low. The solid waste presently is being disposed in the low-lying vacant lands in the city and along the road sides, pits etc., which is not a permissible practice. There is a need for identifying appropriate disposal sites based on the environmental assessment. Over aged/old vehicles and equipment are also the causes for frequent breakdowns in lifting the waste.

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B

Workshop details

Development of Indicators: Feedback from Stakeholders, Kanpur

Agenda

9:30 a.m.	Registration
10:00 a.m.	Presentation on TERI
10:10 a.m.	Introduction to USERS project: Involving stakeholders in the decision-making process
10:20 a.m.	Address by the Chief Guest Shri V K Malhotra, Commissioner, Kanpur Division
10:35 a.m.	Address by the Guests of Honour Mr J N Vishvakarma, Mukhya Nagar Adhikari, Kanpur Mr D S Gundevia, Mahaprahbhandhak, Kanpur Jal Sansthan
10:55 a.m.	Vote of thanks
11:00 a.m.	Tea
11:20 a.m.	Performance measurement: basics and role of stakeholders Open discussion
11:40 a.m.	Water supply indicators: presentation and discussion
12:00 noon	Municipal solid waste indicators: presentation and discussion
12:20 p.m.	Waste water indicators: presentation and discussion
12:40 p.m.	Open discussion and feedback
1:00 p.m.	Vote of thanks
	Lunch

Venue: Hotel Landmark, 10th - The Mall, Kanpur
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Development of Indicators: Feedback from Stakeholders, Delhi

Agenda

9:30 a.m.	Registration
10:30 a.m.	Presentation on TERI
10:40 a.m.	Welcome address by: Dr. Leena Srivastava Dean – Regulatory Studies and Governance Division
10:50 a.m.	Address by the Guests of Honour Mr S P Aggarwal. Commissioner MCD Mr Pradeep Mehra, Chief Executive Officer, DJB
11:15 a.m.	Introduction to USERS project
11:45 a.m.	Tea
12:00 noon	Performance measurement: basics and role of stakeholders Open discussion
12:15 p.m.	Water supply indicators: presentation and discussion
12:30 p.m.	Municipal solid waste indicators: presentation and discussion
12:45 p.m.	Waste water indicators: presentation and discussion
1:00 p.m.	Open discussion and feedback
1:30 p.m.	Vote of thanks Lunch

Venue: Hotel Ambassador, Sujan Singh Park, New Delhi (Ph: 463 2600)

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National Workshop On Indicators for urban environment management: The way forward

Agenda

Day 1: 20th March	
9:00 – 9:30	**Registration**
9:30 – 10:00	Inaugural session *Welcome address*: Dr R K Pachauri, Director, TERI *Inaugural address*: Dr P Venkat Ramana, Assistant Resident Representative, UNDP *Keynote address*: Mr V Suresh, Chairman and Managing Director, HUDCO *Vote of Thanks*: Dr Sumeet Saksena, Fellow, TERI
10:00 – 13:15	**SESSION I: Performance measurement and rating**
	Chairperson: Dr P K Mohanty, Commissioner, Hyderabad Municipal Corporation
	Comparative Performance Measurement of Urban Local Bodies Mr K Mukundan, The World Bank and Mr K N Venkataraman, Project Director, Government of Tamil Nadu
	Urban Services Environmental Rating System Dr Sumeet Saksena, TERI and Dr Rashid Hasan, Ministry of Environment & Forests
	Tea/ Coffee (11:15-11:45)
	Rating of Municipal and Urban Local Bodies Ms Sujatha V. Srikumar, The Credit Rating Information Services of India Ltd (CRISIL)
	Risk Assessment Framework for Urban Local Bodies Mr R Rao, Investment Information and Credit Rating Agency (ICRA)
	Summary and Recommendations
13:15 – 14:15	**Lunch**
14:15 – 18:00	**SESSION II: Urban Indicators**
	Chairperson: Mr P U Asnani, Urban Environment Infrastructure Representative US AEP/US AID
	Development of Urban Indicators for Gujarat Cities- A Pilot of Ten Cities Ms Manvita Baradi and Ms Urvi Mankad, City Managers Association of Gujarat (CMAG)
	Urban Service Indicators for Indian Cities Dr Usha P Raghupati, National Institute of Urban Affairs (NIUA)
	Concepts for Quality of Life Comparisons Dr Prem Pangotra, P&M Research Services (P) Ltd.
	Tea/ Coffee (16:00- 16:30)
	Urban Environment Indicators: Concepts, Use and the Way forward Mr Manish Dubey, TARU Leading Edge Private Ltd.

	Summary and Recommendations
19:00	***Reception* and Dinner :** Silver Oak, India Habitat Centre, Lodhi road, New Delhi-3

Day 2: 21st March

9:30 – 13:15	**SESSION III: Community Perception and Participation in Managing Indian Cities**
	Chairperson: Mr Ramanath Jha, Regional Advisor, Urban Management Program, UNCHS
	Report Card on Indian cities Dr Suresh Balakrishnan, Public Affairs Centre, Bangalore
	Community Participation Dr Neena Gulabani, ACORD
	Peoples Participation Program in Delhi Ms Sunita Bhasin, CONSERVE
	Tea/ Coffee (11:15-11:45)
	Guntur Municipal Corporation- Transparent and Accountable System Mr Praveen Prakash, Commissioner, Guntur Municipal Corporation
	Social Perspective of Performance Measurement Dr Ravikant Joshi, Vadodra Municipal Corporation
	Summary and Recommendations
13:15 – 14:15	**Lunch**
14:15 – 16:40	**SESSION IV: Environment Management Systems and Management Information Systems in Urban Local Bodies**
	Chairperson: Mr K N Venkataraman, Project Director, Municipal Administration, Government Of Tamil Nadu
	Environment Management System for Industrial Townships Dr Aditi Haldar, Development Alternatives
	The Mirzapur Model - A Computerized and GIS Based Municipal System Mr S K Relan, Ganga Institutional and City Development Project (ICDP-2)
	Developing MIS for Municipal Corporations - Issues and Complexities Dr Ravikant Joshi, Vadodra Municipal Corporation
	Developing a Framework for Municipal Information Systems Mr B Rajesh and Mr Shrinivas Kowligi, Price Waterhouse Coopers
	Summary and Recommendations
16:40 – 17:00	**Tea/Coffee**
17:00 – 18:00	*Valedictory session:* Mr N N Ojha, Additional Director General - Cantonment, Ministry of Defence
	Presentation of Summary and Recommendations

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